# CLINICAL OUTCOME OF LAPAROSCOPIC MANAGEMENT OF APPENDICULAR MASS

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**Submitted By**

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*Dedicated to my*

*parents,*

*teachers, and*

*friends*

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***Dr. Anmol khosla***

# LIST OF ABBREVIATIONS

| | |
|---|---|
| CECT | Contrast enhanced computed tomography |
| CRP | C-reactive protein |
| CT | Computed Tomography |
| ICU | Intensive Care Unit |
| LA | Laparoscopic appendicectomy |
| MRI | Magnetic resonance imaging |
| N | number |
| OA | Open appendicectomy |
| OR | Odd's ratio |
| RIF | Right iliac fossa |
| SBO | Small bowel obstruction |
| USG | Ultrasonography/ultrasound |
| WBC | White blood cells |
| YLD | Years lived with disability |

# ABSTRACT

**Introduction:**

Acute appendicitis remains the most common intraabdominal surgical pathology requiring surgical intervention. The cases of patients presenting late in the course of acute appendicitis are complicated by the development of an inflammatory mass in the right iliac fossa. This mass, is in fact the bodys own protective mechanism to wall off the infection and prevent diffuse peritonitis from developing. The treatment of appendicular mass is controversial. It is changing from the traditional approach of initial conservative treatment followed by interval appendectomy to immediate appendectomy. Moreover, there is growing evidence that Laparoscopic Appendicectomy is better for such cases, with it providing us better visualization of the abdominal cavity and surrounding structures than the minimal McBurnleys incision given in Open appendicectomy. And that is going to be the focus of our study.

**Aim of Study**:

To analyse the factors contributing to Morbidity following laparoscopic management of appendicular mass.

To evaluate outcome following laparoscopic management of appendicular mass.

**Materials & Methods:**

A prospective study of patients with Appendicular mass undergoing Laparoscopic management in the department of General Surgery, Dayanand medical college and hospital, over a period of 2 year .



**Keywords:**

Laparoscopic Appendicectomy, Appendicular mass,Early Appendicecomy.

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# INTRODUCTION

Acute appendicitis is a frequent intra-abdominal condition that necessitates surgery. One in ten admitted with acute appendicitis develops appendicular mass. Although surgical treatment for acute appendicitis is commonly acknowledged, there continues to be ongoing discussion concerning the approach to managing an appendiceal mass. Patients with an appendicular mass commonly experience a range of symptoms that aid in diagnosis. Abdominal pain, typically over the right-lower quadrant, is a hallmark sign. Tenderness upon palpation of appendix area and the presence of a mass palpable in right iliac fossa are often observed. In addition to these, patients may experience fever due to the inflammatory response. Gastrointestinal symptoms such as nausea, vomiting, and loss of appetite are also common, indicating the effect of the condition on the digestive tract. Alterations in bowel patterns, like diarrhea or constipation, may occur, and patients might describe a general sense of discomfort or unease referred to as malaise. These symptoms, particularly when accompanied by signs of inflammation such as fever, leukocytosis, and elevated inflammatory markers, necessitate further evaluation to confirm the presence of an appendicular mass. It is crucial for healthcare providers to consider these symptoms collectively, as they can help differentiate an appendicular mass from other conditions with similar presentations.[1]

Appendicitis is marked by appendix inflammation, often manifesting suddenly within a 24-hour period. However, if perforation happens, leading to a contained abscess, symptoms may emerge more slowly and with less intensity. Globally. Acute appendicitis accounts for the most common condition for abdominal surgery in children and abdominal emergency [2–5].

Inflammation of the appendix leads to a range of symptoms, including abdominal pain, fever, nausea, and vomiting. While acute appendicitis usually progresses rapidly, leading to severe symptoms requiring immediate medical attention, cases involving perforation and abscess formation may have a slower onset, with symptoms that initially seem

less severe. Nevertheless, early diagnosis and treatment are essential to prevent complications like peritonitis, abscess rupture, and systemic infection, all of which can significantly impact patient outcomes [6,7].

Appendicitis commonly arises from a blockage in the appendix's lumen, sparking inflammation. The inflammation is attributed by appendicoliths, tumors, parasites in the gut, or lymphatic tissue enlargement which leads to obstruction.

Majority of surgeons favor a conservative approach for treating an appendicular mass, utilizing antibiotics. This method has a relatively high success rate. When patients with acute appendicitis delay seeking treatment, they often develop an inflammatory mass in the right iliac fossa. There is ongoing debate about the best way to treat this appendicular mass. The traditional method of initially using conservative treatment and performing an appendectomy later is increasingly being replaced by the approach of immediate appendectomy [8,9].

Timely surgical intervention was acknowledged as a viable option compared to conservative approaches, leading to notable reductions in overall hospitalization duration and negating the necessity for subsequent admissions[10].However, in 10-20% cases, conservative treatment proves ineffective, prompting urgent surgical intervention due to peritonitis, which poses increased complexity and is correlated with elevated morbidity and mortality rates. Additionally, patients may encounter recurrent appendicitis following discharge [11,12].

In rural areas, many patients refuse surgery once their acute symptoms resolve, highlighting a major drawback of initial conservative treatment [13,14]. Another drawback is the potential for misdiagnosis, where intussusception and cecal carcinoma wereconservatively treated, resulting in notable morbidity [15].

Early surgery, by contrast, is curative during the initial hospital stay, ensuring a quicker return to work and better patient compliance. The controversy extends to management strategies and the choice of technique, whether laparoscopic or open surgery.

For years, open appendectomy has been the established norm for addressing various forms of appendicitis. Surgeons frequently opt for sizable incisions in the right iliac fossa due to potential complexities such as adhesions, omental wrapping, and abscesses [16,17]. Late 19th century, laparoscopic appendectomy garnered recognition as a viable approach for addressing simple appendicitis. Nevertheless, its application in treating complicated appendicitis continues to be a subject of contention among medical experts [18–20].

Laparoscopic appendectomy is increasingly favoured as the primary method for addressing acute appendicitis. Yet, its efficacy in managing complicated appendicitis remains a point of contention. This study assessed the clinical outcomes of laparoscopic appendectomy in patients with complicated appendicitis. We aim to elucidate whether this minimally invasive approach can serve as a feasible alternative to traditional open surgery in such challenging cases.

# AIMS AND OBJECTIVES

- To analyze the factors contributing to Morbidity following Laparoscopic management of Appendicular mass.
- To evaluate outcome following laparoscopic management of appendicular mass.

# REVIEW OF LITERATURE

**Appendicular mass:**

An appendicular massvaries in severity from simple inflammatory masses to complex abscesses. It emerges as a localized inflammatory response triggered by acute appendicitis, characterized by a collection of inflamed tissue and potentially pus. Typically, it involves a contained accumulation of inflamed tissues, including the appendix, omentum, and neighbouring bowel loops. Symptoms commonly associated with this condition include abdominal pain, tenderness, and a mass in the right iliac fossa[1].

Appendicular mass management is debated, with differing opinions on immediate surgical intervention versus conservative approaches such asthe Ochsner-Sherren regimen and interval appendectomy [(21)].
Studies suggest that early appendectomy for appendiceal masses can serve as a safe and efficient alternative to conventional conservative approaches, leading to reduced complications, shorter hospitalizations, and decreased overall expenses. While conservative management, encompassing antibiotics and percutaneous drainage, may prove effective, certain instances may necessitate surgery due to complications such as abscess formation. This highlights the importance of personalized patient care and prompt decision-making in managing appendiceal masses.[(22)]

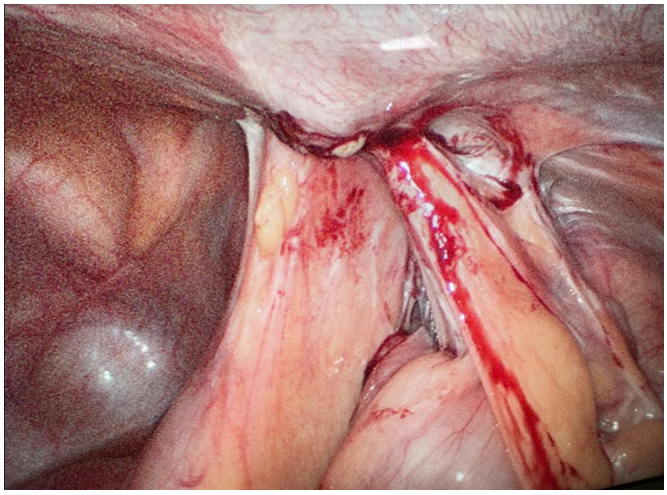

**FIGURE 1: INTRAOPERATIVE IMAGE OF CASE PRESENTING WITH APPENDICULAR LUMP ON CLINICAL EXAMINATION. OMENTUM, WITH BOWEL LOOPS CAN BE ADHERED TO THE ANTERIOR ABDOMINAL WALL. APPENDIX WAS FOUND WITHIN THIS MASS.**

The variability in the presentation and severity of appendicular masses underscores the importance of a tailored approach to treatment. Factors including patient's health, inflammation, and complications like abscesses must be carefully considered when deciding between surgical intervention and conservative management. Additionally, ongoing research is needed to further elucidate the optimal management strategies for appendicular masses, ensuring that patients receive the most effective and least invasive treatments possible [23,24].

**Acute appendicitis:**

**Burden/Prevalence:**

Appendicitis, a prevalent abdominal surgical emergency globally, presents considerable health hazards including ileus, peritonitis, abscess formation, and potential mortality, along with imposing substantial economic strains on healthcare systems [25,26]. Its incidence averages around 233 cases per 100,000 individuals annually, with a lifetime risk of around 10%. While Western nations observed a decline in burden during the 1950s. [26–28].

A comprehensive systematic review published in 2023 extensively explored the global prevalence and incidence trends of appendicitis spanning from 1990 to 2019. In 2019 alone, there were approximately 672,203 prevalent cases worldwide, translating to a prevalence rate of around 10 per lakh population, marking a notable 20.8% increase since 1990. Concurrently, there were an estimated 17,698,765 incident cases during the same year, with an incidence rate of 229.9 per lakh population, indicating a substantial 20.5% rise over the observed period [29].

In 2019, the prevalence rate was high per lakh population at the regional level. Latin America exhibited a prevalence rate of 32.5, followed by High-income Asia Pacific with a rate of 17.2, and Central America with a rate of 13.6 [23]. While Oceania, Africa reported the lowest prevalence rates in 2019. Oceania had a prevalence rate of 4.1, followed by Western Sub-Saharan Africa with a rate of 4.5, and Eastern Sub-Saharan Africa with a rate of 4.7. These regional disparities in prevalence rates highlight variations in the burden of appendicitis across different geographical areas, suggesting potential discrepancies in healthcare accessibility, environmental influences, and genetic predispositions among diverse populations [29].

The disease burden, assessed in years lived with disability (YLD), exhibited a consistent upward trajectory from 1998 to 2019, with appendicitis contributing to a total of 211,113 YLD globally in 2019. Interestingly, there were significant variations in YLD rates across different regions, with nations like Ethiopia, India, and Nigeria experiencing substantial escalations, while others such as Peru, Mongolia, and Guatemala witnessed considerable declines. Age-wise, both the prevalence and incidence rates peaked in the less than 20 years age group, subsequently declining steadily with ageing [29–32].

**Etiology/Risk factors:**

Naturally, both aerobic and anaerobic bacteria areharbored in the appendix. Any obstruction in the lumen can cause bacterial colonization, instigating inflammation and abscess. Research on advanced sequencing techniques uncoveredthat complicated patients exhibit a higher abundance of bacterial phyla. This observation suggests a potential link between the severity and complications of appendicitis and an increased presence of bacterial species.[33].

In children, appendicitis is predominantly linked to lymphoid hyperplasia, which involves anlymphoid tissue excessive growth, resulting in inflammation and ischemia [(34)].Conversely, in adults, it typically after infections, fecaliths, or tumors [(35)].

**Pathogenesis:**

Acute appendicitis is complex condition with various underlying mechanisms, typically classified into two main types: complicated appendicitis, characterized by necrosis and perforation, and uncomplicated appendicitis, where perforation may not occur [(36,37)].While luminal obstruction is widely believed to be the primary trigger in most cases, conclusive evidence for this hypothesis is still lacking. Complications arising from acute appendicitis can significantly increase mortality and morbidity rates, highlighting the critical importance of accurate diagnosis and timely treatment [(38)].

Microbiome analysis has shed light on the microbial composition associated with different forms of acute appendicitis. Complicated appendicitis exhibits an expansion of oral bacterial pathogens within the appendix, whereas uncomplicated cases display gut-associated microbiomes[39].This discovery underscores the potential of advanced microbiome diagnostics in improving non-surgical treatment options for uncomplicated acute appendicitis. A thorough comprehension of acute appendicitis's pathogenesis is essential for refining diagnostic accuracy and maximizing patient outcomes [(37)].

**Clinical features:**

**Classical Presentation of Acute Appendicitis:** [40]

Acute appendicitis is commonly characterized by a set of well-recognized symptoms. Typically, patients experience:

Periumbilical Pain: Initially, the pain starts around the navel (periumbilical region).

Migration of Pain: Shifting to the lower right side of the abdomen, specifically the right iliac fossa.

Anorexia: Loss of appetite is a frequent accompanying symptom.

Fever: Mild fever often develops as the condition progresses.

Tenderness: The right iliac fossa becomes tender to touch.

**Atypical Presentations of Acute Appendicitis:** [41,42]

However, not all patients exhibit these classic symptoms. There are documented cases where appendicitis presents atypically, with symptoms that can be misleading, including:

Umbilical Inflammation: Inflammation or redness around the navel.

Scrotal Pain: Pain in the scrotum, which can be confusing and point to other conditions.

Inguino-Scrotal Swelling: Swelling in the groin and scrotal areas.

Anorexia: Similar to classic symptoms, loss of appetite is also seen in atypical cases.

Weakness: Generalized weakness or fatigue.

Abdominal Fullness: A sensation of bloating or fullness in the abdomen.

Bilateral Pedal Edema: Swelling of both feet, which is an unusual symptom for appendicitis.

**Evaluation/Investigation:**

**History and Physical:**

Primarily acute appendicitis starts with diffuse or periumbilical pain in the abdomen, localisedover the lower-right abdominal quadrant. The pain associated with appendicitis arises from the stimulation of visceral T8-T10 fibres. Diffuse pain becomes more localized then shifts to the

adjacent parietal peritoneum. Patients may experience pain severe enough to disrupt sleep or exacerbate with movement. Alongside abdominal pain, symptoms may include loss of appetite, nausea, diarrhoea, and increased frequency of urination. One-third of patients may present with a fever. Some patients may also exhibit atypical or less common symptoms [43].

Initial-stage physical examination findings are frequently less revealing. However, as it advances, peritoneal irritation becomes prominent. These signs may include localized over the right-lower abdominal quadrant. The tenderness rebounds at McBurney's point, positioned aroundtwo inches from the “anterior superior iliac spine (ASIS)” on a straight line to the umbilicus. Though the symptoms are not exclusive, they are similar.It's important to note that these symptoms are not exclusive to appendicitis and may also be observed in other conditions. ted with suspected appendicitis include:Dunphy sign, Rovsing sign and Psoas sign[44].

The progression of symptoms in acute appendicitis varies greatly among patients. Typically, symptoms intensify gradually over 12 to 24 hours from the onset. In complicated cases, however, symptoms may persist for more than 48 hours. Three-fourths of patients seek medical attention within 1 day of symptom onset. The risk of rupture is about 2% within 3 days after symptoms begin withan increasing trend without proper medical intervention.

If the appendix ruptures, further complications can occur, such as pyle-phlebitis, thrombosis, hydroureteronephrosis, obstruction in the bowel, and the formation of fistulae internally. These fistulae may connect to the bladder, vagina, uterus, or skin [45].

**Evaluation:**

**Laboratory:**

Evaluation includes a total leukocyte count along with differential and serum C-reactive protein (CRP) levels[46].When considered together, WBC and CRP levels provide strong predictive value in distinguishing

between uncomplicated and complicated appendicitis. Specifically, normal WBC and CRP levels effectively ruling out acute appendicitis[47]. Leucocytosis, or an elevated WBC count, occurs in about two-thirds of patients with acute appendicitis and may be accompanied by a left shift or bandemia, indicating an increase in immature white blood cells. Although no single laboratory test can confirm acute appendicitis, majority with the condition have a WBC greater than 10,000 cells/$mm^3$.

**Imaging**

Imaging techniques such as computed tomography (CT), ultrasonography (US), and magnetic resonance imaging (MRI) can enhance the accuracy of the diagnosis. CT is the preferred imaging method due to its high sensitivity and specificity. Although USG is less sensitive and specific than CT, it serves as a key model for evaluating children and pregnant women. MRI is beneficial for pregnant women with suspected appendicitis when ultrasound results are inconclusive.

**CT**

CT with intravenous contrast in abdominopelvic regionis highly accurate in diagnosing acute appendicitis in adults, with an accuracy rate exceeding 95%.

**CT Criteria for Diagnosing Appendicitis**

The diagnosis of appendicitis using CT involves several specific features, including:

Enlarged Appendix: Outer diameter greater than 6 mm.

Thickened wall: More than 2 mm.

Peri appendiceal Stranding with fat: Indicates inflammation.

Wall Enhancement: Increased visibility of the wall due to inflammation.

Base inflammation: Demarcates the appendix from the cecum.

Appendicolith: Calcified deposit inside the appendix.

It is uncommon to observe intraluminal contrast media or air due to luminal distention [(47)].

**Concerns and Considerations**

The primary consideration with abdominopelvic CT scans is radiation exposure. The exposure from a standard abdominopelvic CT is roughly 4 mSv, meager than the natural exposure of around 3 mSv. The higher radiation doses yield higher-resolution images; lower doses do not compromise clinical outcomes. Additionally, abdominopelvic CT scans with intravenous contrast should be conducted on patients with a glomerular filtration rate (GFR) of at least 30 ml/minute per 1.73 $m^2$ to ensure safety.[48–50].

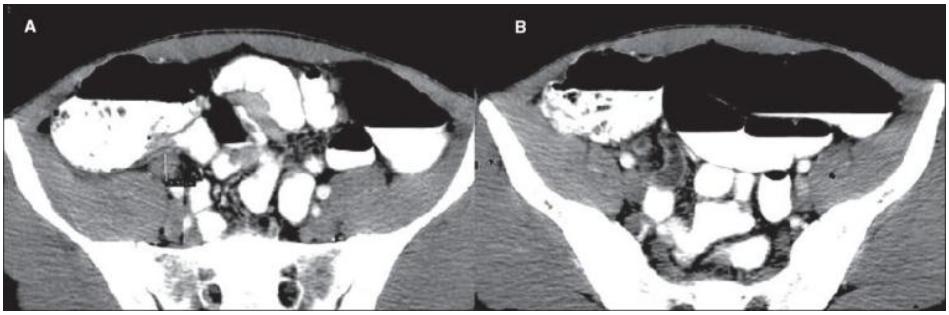


**FIGURE 2: APPENDICITIS WITH CONTRAST-ENHANCED CT SCAN WITH THICKENED, FLUID-FILLED TUBULAR STRUCTURE IN THE RIGHT HEMIPELVIS, CONTIGUOUS WITH THE CECAL BASE** (51)

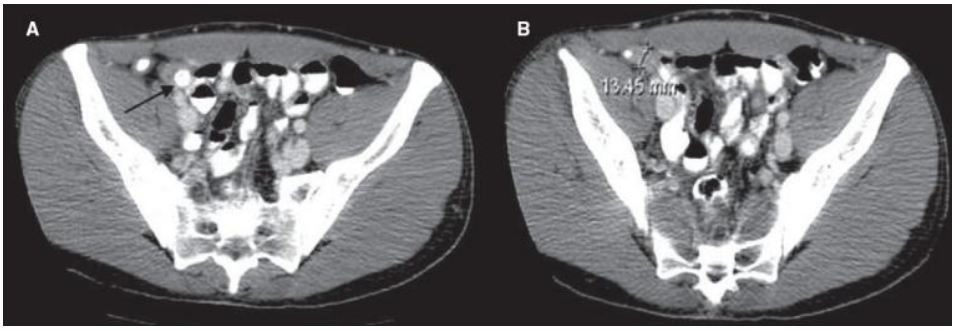


**FIGURE 3: APPENDICITIS WITH SHOWING DILATED TUBULAR STRUCTURE WITH APPENDICOLITHS**

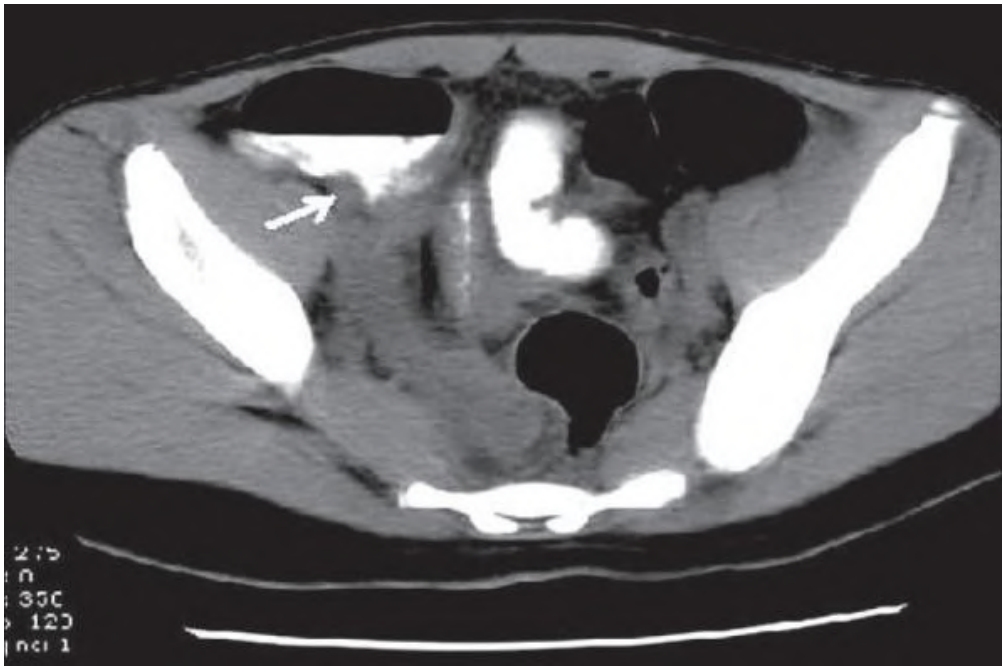

**FIGURE 4 : CT SHOWING AN ARROWHEAD-SHAPED CONTRAST COLLECTION IN THE CECUM**

**FIGURE 5: PERFORATED APPENDICITIS. CT SHOWING DILATED APPENDIX WITH AN APPENDICOLITH AND PERIAPPENDICEAL ABSCESS**

**Ultrasonography**

Abdominal USG is an accessible imaging method commonly used as initial tool for evaluating acute abdominal pain, particularly predominant imaging option for children and pregnant women and children.

**Ultrasonographic Indicators of Acute Appendicitis**

**Key ultrasonographic findings that suggest acute appendicitis include:**

Anteroposterior Appendiceal Diameter: Greater than 6 mm.

Presence of an Appendicolith: A calcified deposit within the appendix.

Increased Echogenicity of Periappendiceal Fat: Indicates inflammation.

**Limitations of Abdominal Ultrasound**

Several factors can limit the effectiveness of abdominal US in evaluating suspected acute appendicitis: Obesity and patient discomfort: [52].

**FIGURE 6: USG OF THE RIGHT LOWER QUADRANT, WITH BLIND ENDING TUBULAR STRUCTURE (7 MM)**

**Magnetic Resonance Imaging (MRI) [53]:**

Abdominopelvic MRI is known for its high sensitivity and specificity in diagnosing acute appendicitis. MRI is primarily indicated for specific patient groups where minimizing radiation exposure is crucial, most notably pregnant patients. MRI protocols involve imaging in planes with rapid sequence featuring T2 weighting. Some protocols may include T2 fat-suppressed imaging.

**The Use of Scoring Systems:**

Scoring systems were formulated to diagnose promptly. The scoring is based on medical history, physical examination, laboratory results and imaging findings. Among these, the Alvarado scoring system, introduced in 1986, holds widespread use, while modified version of the same scoring system is used.

**Modified Alvarado Scoring System**

System assigns points to specific diagnostic criteria as follows:

- Tenderness in the right-lower quadrant (2 point)
- Leukocytosis(2 point)

**1 Point:**

- Migratory pain to the right-lower quadrant
- Rebound tenderness
- Fever
- Nausea or vomiting
- Anorexia (loss of appetite)

The maximum score a patient possibly is 9 points. Higher scores correlate with acute appendicitis. A score of 7 or above is strongly attributedto appendicitis [54].

**Complications**

**Appendicular perforation:**

Appendicular perforation, a severe complication of acute appendicitis, involves the rupture of the appendix. Studies show that this condition is

more prevalent among younger individuals and occurs more frequently in males. Common symptoms include abdominal pain, vomiting, and fever, with peritoneal contamination being a major complication that increases morbidity and mortality rates[55].Delayed diagnosis and perforation at the base of the appendix are linked to poorer outcomes, underscoring the importance of early detection and intervention. Surgical treatment, such as an appendectomy, is crucial for controlling sepsis and minimizing contamination[56].In situations where laparoscopy is not available, open surgery is preferred. Prompt recognition and suitable surgical intervention are vital for managing appendicular perforation and improving patient outcomes.

**Mechanism of formation of appendicular lump after perforation:**

The formation of an appendicular lump following perforation is typically due to inflammatory processes and complications from underlying conditions[21]. These lumps can range from simple inflammatory masses to more complex structures, such as a gangrene, perforation with pus collection, i.e., abscess[57].In some instances, a perforated appendix can cause localized peritonitis, which may mimic an appendicular lump but actually result from conditions like a malignant stricture of the transverse colon or Meckel's diverticulum. Additionally, foreign objects such as dentures can contribute to appendix perforation, leading to the formation of an appendicular lump[58]. Delayed treatment of acute appendicitis can lead to the development of such lumps, underscoring the importance of early surgical intervention to prevent complications such as gangrene or generalized peritonitis [(59)].

**Management:**

**Conservative/Medical management:**

Despite progress in utilizing primary antibiotic therapy for acute appendicitis, surgery remains the primary treatment choice. In a significant randomized trial comparing antibiotic therapy with appendectomy for acute appendicitis, initial outcomes appeared similar, yet 25% of treated with antibiotics required appendectomy less than a year [(59)].

One study noted increased rates of 30-day post-intervention peritonitis in the antibiotic therapy group. However, other research supports the likelihood of using antibiotics alone, regardless of the risk of recurrency [60–62].

An observational study confirms that surgical management continues to be the most effective approach for treatment [63].

**Oschner Sharron regimen:**

The Ochsner-Sharron regimen is not explicitly discussed in the provided contexts. However, research articles examine various dosage regimens for treating diverse medical conditions. Orford et al. propose innovative dosage schedules for managing acute exacerbations of inflammatory conditions and chronic obstructive pulmonary disease[64]. Dreznik et al. compare postoperative outcomes between triple antibiotic therapy and dual therapy for perforated appendicitis, concluding that dual therapy with ceftriaxone and metronidazole is both more cost-effective and efficient[65]. Philpott et al. investigate the safety and efficacy of administering large single doses of perhexiline for acute coronary syndromes, underscoring the rapid achievement of therapeutic drug levels and minimal adverse effects with an 800-mg loading dose [66].

**Failure of conservative management:**

The lack of success in conservative management for acute appendicitis typically arises when non-surgical approaches, such as antibiotics or observation, fail to adequately alleviate symptoms or address associated complications. Conservative management is often attempted in cases of uncomplicated acute appendicitis, where antibiotics are administered to mitigate inflammation and infection without immediate surgical intervention. However, if the patient's condition deteriorates, if complications like perforation or abscess formation arise, or if there is no improvement within a specified timeframe, conservative management may be considered ineffective. In such instances, surgical intervention, typically through an

appendectomy (removal of the appendix), becomes necessary to prevent further complications and resolve the underlying condition.

**Surgical management-**

**Appendectomy:**

**Laparoscopicappendectomy:**

The gold standard intervention is an appendectomy. In many cases, the laparoscopic procedure is emerging as a chosen minimally invasive surgical approach over the open method. Most uncomplicated cases are now conducted with laparoscopy. Numerous studies have projected a lower rate of wound infection, reduced postoperative analgesic necessity, and quicker hospital discharge in the laparoscopic group. However, it's worth noting that laparoscopic appendectomy may entail a longer operative time compared to the open approach [(66)].

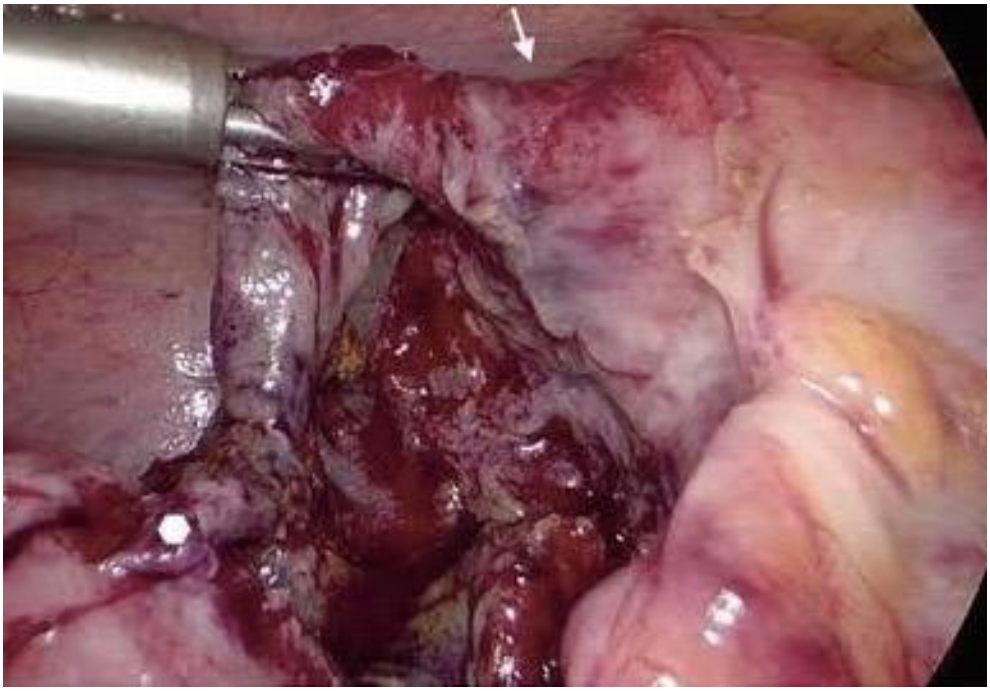

**FIGURE 7: INTRAOPERATIVE IMAGE OF A CASE OF GANGRENOUS APPENDIX WITH APPENDICULAR MASS. BASE OF APPENDIX GANGRENOUS IN THIS CASE HENCE REMOVAL WAS DONE USING A STAPLING DEVICE (AFTER DISSECTION AND EXPOSURE)**

**FIGURE 8: INTRAOPERATIVE IMAGE OF A CASE OF GANGRENOUS APPENDIX WITH APPENDICULAR MASS. BASE OF APPENDIX GANGRENOUS IN THIS CASE HENCE REMOVAL WAS DONE USING A STAPLING DEVICE (BEFORE REMOVAL WITH STAPLER)**

**History of Laparoscopic surgeries:**

The history of laparoscopic surgeries represents a significant leap forward in modern medical practice, fundamentally altering surgical methodologies and patient treatment. The origins of laparoscopy can be traced back to the early 20th century, where pioneers such as Georg Kelling and Hans Christian Jacobaeus experimented with basic instruments and visualization methods. Breakthroughs in fiber-optic technology and advancements in video imaging systems during the 1970s and 1980s laid the groundwork for the creation of advanced laparoscopic instruments and apparatus. A pivotal moment occurred in 1985 when Philippe Mouret conducted the inaugural laparoscopic cholecystectomy, a landmark event in surgical history. Subsequently, laparoscopic techniques have undergone rapid evolution,

encompassing a diverse array of procedures spanning multiple surgical disciplines, including gynecology, urology, and general surgery. Presently, laparoscopic surgery epitomizes minimally invasive approaches, providing patients with abbreviated recovery periods, diminished postoperative discomfort, and enhanced cosmetic results in contrast to traditional open surgical methods [67].

**Open appendectomy:**

While laparoscopic appendectomy is commonly preferred for acute appendicitis, open appendectomy remains practical in certain scenarios like complicated cases with phlegmon. Emerging techniques like “Natural Orifice Transluminal Endoscopic Surgery (NOTES)” and “Single-incision Laparoscopic Surgery (SILS)” offer alternatives. NOTES access the peritoneal cavity through natural openings, potentially reducing postoperative pain and visible scarring. However, limited data hinder a comprehensive comparison of outcomes. A key drawback is the need to combine notes with laparoscopy for adequate retraction and site closure verification [68–70].

**Prognosis:**

Based on a global study, the fatlaity rate for appendicitis is documented at 0.28% [71]. Notably, mortality rates tend to be higher in less industrialized nations, ranging from 1% to 4%, compared to an average of approximately 0.24% in industrialized countries. Various factors contribute to heightened mortalityin appendicitis cases. Early diagnosis and treatment of appendicitis typically result in recovery within 1-2 days. Individuals with abscesses, peritonitis, and sepsis may undergo prolonged and complex recovery process, potentially necessitating additional surgical interventions.

**Complications [72]**

The primary complication post-appendectomy is surgical site infection, posing the highest risk among patients with complications, especially those with perforation. Complications at surgical site include abscesses

and wound infections, with hematomas and pain, which are commonly encountered. Recurrent appendicitis may impact nearly half of non-operatively managed patients, with recurrence rates varying across studies and follow-up durations. To address the risk, interval appendectomy may be considered. Stump appendicitis, stemming from incomplete appendectomy, can lead to inflammation in the remaining appendiceal stump. Keeping the stump size ≤5 mm reduces the risk, with stump resection via open or laparoscopic methods being the definitive therapeutic approach, often requiring extensive bowel resection for perforated appendiceal stumps. Untreated or complicated appendicitis can lead to severe consequences like diffuse peritonitis and sepsis, resulting in significant morbidity and, in some cases, fatalities.

**S.E. Attwood (1992)** conducted a randomized trial to comparing the outcomes of laparoscopic and open appendectomy. Following randomizing into two groups: 30 patients underwent laparoscopy, 32 underwent classical open appendectomy and the researcher's compared recovery, and complications. The results indicated laparoscopy group was discharged earlier and had fewer complications [73].

**C.K. Kum et al. (1993)** conducted a study involving 137 patients diagnosed with acute appendicitis. Patients were randomized to laparoscopic or open appendectomy. The duration of laparoscopic appendectomy was comparable to that of the open procedure (average 43 vs. 40 minutes). Both groups required similar doses of pethidine immediately postoperatively, but the laparoscopic group needed fewer doses of oral analgesics (naproxen sodium) compared to the open procedure group (2.8 vs. 5.0). There were no significant differences in the length of admission. Higher proportion (9%) of wound infections was reported in the open appendectomy group. The study concluded that laparoscopic appendectomy may reduce wound infections and facilitate an earlier recovery [(20).]

In **1992, OJ McAnena et al**, [74] study reports a systematic assessment of laparoscopic surgery for acute appendicitis conducted over a period of 6 months. A total of 65 patients, aged between 14 and 64, who exhibited signs and symptoms of appendicitis requiring surgery, were divided into two groups: open surgery (n=36) and laparoscopic surgery (n=29). The average duration of post-operative hospitalization for open surgery was 4.8 days, whereas for laparoscopic surgery, it was 2.2 days. The incidence of wound infection was 11% for open appendectomy and 4% for laparoscopic appendectomy. After Open Appendicectomy patients had a median of 5Intramuscular injection of analgesia compared with a median of one in Laparoscopic group ($P<0.05$). As a potential alternative to open surgery for the treatment of acute appendicitis, the findings showed that laparoscopic appendectomy needs to be investigated further as an emergency procedure.

A comparative study by **V.L. Vallina et al in 1993** [75] came to the conclusion that laparoscopy is an effective addition to the treatment of individuals who have a presumptive diagnosis of appendicitis. According to the findings of a meta-analysis that included 35 randomized controlled trials, the duration of the operation was substantially longer for laparoscopy, although the length of stay in the hospital was shorter. On the first post-operative day, 81% of patients were released, which is statistically significant. Notably, the patients who had laparoscopic appendectomy needed a much lower amount of narcotic analgesics.

**In Heikkinen T. J. et al (1998)** [76] study the outcomes and the costs and benefits of open appendectomy and laparoscopic appendectomy were measured and compared. The year 1998 saw a total of 19 people undergo lap appendectomy, while 21 patients got open appendectomy. In their study, they discovered that the median operating time for laparoscopic appendectomy was 91 minutes, whereas the duration for open appendectomy was 82 minutes. There was no discernible

difference in the levels of post-operative discomfort or weariness. When it came to the lap, the return to regular activity was fourteen days. The appendectomy took 26.5 days, whereas the open procedure took 26.5 days. The hospital cost for the laparoscopic appendectomy was $8538, while the open procedure was $6788. The conclusion that can be drawn from this is that laparoscopic appendectomy is just as safe as open appendectomy. Although the costs of the hospital are greater, laparoscopic appendectomy delivers considerable cost savings to the payer for working patients since it allows them to resume their employment sooner.

**Senapathi et al. (2002)** conducted research to assess the effectiveness on laparoscopic appendectomy (LA). Of 62 cases, 50 for suspected appendicitis, 2 for generalized peritonitis, and 10 for appendicular mass. Laparoscopically, all the appendectomies attempted were successful. No fatalities were reported. None experienced complications. There was no significant difference in operative time or postoperative hospital stay (operative time: 45 vs. 40 minutes; hospital stay: 2 vs. 1-2 days). The study concluded that early LA is feasible, eliminating the need for a further admission [8].

**Utpal De et al. (2002)** evaluated the feasibility of conducting acute appendectomy with appendicular mass. Patients were operated for appendicular mass within 24 hours of admission, and none experienced complications. McBurney's incision with a Rutherford-Morrison extension was conducted in most cases. Of the 48 patients with appendicular mass, 28.7% had abscesses, 16.1% had a pus collection more than 10ml. The average operative time is 65 minutes. Pathological evidence was confirmed in all patients. Minor wound infections occurred in 15 patients [(9)] .

In Jan **2004, U Guller, S Hervey et al** [(77)] conducted a retrospective study of 43757 patient database (discharge abstracts).7618 patient (17.4%) underwent laparoscopic and 36139 patient (82.6%) open

appendectomy. With an average age of 30.7 years, the patient was there. It was observed that laparoscopic Appendectomy was associated with shorter median hospital stay (Lap Appendectomy :2.06 days, Open appendectomy 2.88 days, lower rate of infection decreased gastro intestinal complications lower overall complication and higher rate of routine discharge. According to the findings of the research, laparoscopic appendectomy was shown to have considerable benefits over open appendectomy in terms of the amount of time spent in the hospital, the rate of routine release, and the post-operative morbidity that occurred inside the hospital.

A prospective study from July 2014 to august **2015 by Dr.P.Sathis Prabhu** et al [(78)] in Dr.M.G.R medical University Chennai, involved 60 patient with diagnosis of acute appendicitis and concluded that Lap Appendectomy in properly prepared and selected patient, had many advantages in terms of post-operative pain, post-operative complication like vomiting, wound infection, fever, duration of hospital stay, return to work cosmetic benefits at the cost of increase in duration of surgery. Lap appendectomy is becoming more popular, especially among young women of childbearing age. This is because the differential diagnosis of discomfort in the right bottom quadrant is rather vast, and it includes gynecologic disease. The increased cost of surgical equipment is frequently cited as a major disadvantage by those who are opposed to laparoscopic appendectomy. Despite these concerns, however, the cost effectiveness of laparoscopic appendectomy is easily realized once the decreased length of hospital stay and the entire patient's convalescence period are taken into consideration.

**De UTPAL** [(79)] (2004) conducted a study in west Bengal, India, 2015 on 279 patient suffering from acute appendicitis. He determined that for Lap Appendectomy, the duration of hospitalization was much shorter and the cost of the operation seemed to be almost the same as open surgery. In addition, Lap appendectomy was linked to enhanced clinical

comfort, as shown by a reduction in wound infections, quicker recuperation time, earlier return to work, and superior cosmetic outcomes.

Laine S, **Rantala A** [80] determined that performing laparoscopic procedures on younger women with right iliac fossa discomfort may provide an accurate diagnosis and decrease the occurrence of unnecessary appendectomies. In **2007 Yong JL**et al [81], during their retrospective study on 82 patients who underwent Lap appendectomy (Group A) and 119 underwent Open appendectomy (Group B). The median durations of surgery in Group A and Group B were 80 minutes (with a range of 40 to 195 minutes) and 60 minutes (with a range of 25 to 260 minutes), respectively. The post-operative complication rate was similar across the two groups, with a rate of 13.4% in Group A compared to 15.8% in Group B. The median duration of hospitalization for patients in Group A and Group B was 3.0 days and 4.0 days, respectively. Therefore, it was determined that Lap Appendectomy for suspected acute appendicitis is a secure procedure and is linked to a considerably reduced length of hospitalization. The Laparoscopic appendectomy may provide a more precise diagnosis for other intraabdominal illnesses as well.

In **2008, Abdul-Wahed and N. Meshikhes** [82] conducted a study revisiting contentious issues regarding the management of appendicular mass, asserting that emergency appendicectomy for appendix mass is emerging as an alternative to conventional conservative treatment. This approach is deemed feasible, safe, and cost-effective, facilitating early diagnosis and treatment of unexpected pathology. However, determining the optimal timing for emergency surgery remains ambiguous. For patients aged over 40 years, further investigations such as colonoscopy and computed tomography scan are necessary to exclude other potential causes of right iliac mass, with close follow-up recommended. Laparoscopic appendicectomy, whether

performed in an emergency or interval setting, is both feasible and safe, and is advocated to replace the conventional open method.

A study conducted by **Bahram, M. A. [83] in 2010** evaluated the feasibility and safety of immediate appendicectomy in 46 patients presenting with appendicle mass. Peri-appendiceal abscesses were detected in 25% (11 out of 46) of the patients. Adhesolysis and localization of the appendix presented challenges in 10% of cases (4 cases). Superficial wound infections were seen in 17% of patients (8 cases), whereas deep wound infections were observed in 9% of patients (4 cases). The mean hospitalization duration was 3 ± 0.25 days. The research determined that doing surgery at an early stage in patients with appendicle mass is both practical and secure, effectively reducing the risk of problems arising from misdiagnosis and improper treatment of other surgical ailments.

**Shindholimath et al. (2011)** evaluated the feasibility of laparoscopic appendectomy in appendicular mass. Of the 120 patients treated for appendicitis, around 15% were found to have an appendicular mass at admission. The mean operative duration was 95 minutes. Patients stayed in the hospital for an average of six days, with stays ranging from 6 to 9 days. Postoperative complications were observed in three patients (15.7%), including wound infections and lump below the umbilical port.[84]

In Aug **2017, study by Tomonide Hori et al [85]** concluded that acute appendicitis is physiologically progressive and as time passes, its difficult to control. Hence prompt Laparoscopic Appendectomy is a quadratic/ tertiary care hospital is mandatory for Acute appendicitis. Interval/ delayed appendectomy and conservative management may be less costly but arte unsuitable. Cost reduction might potentially be achieved by implementing stricter use of disposable equipment and standardizing recovery processes.

In a prospective study conducted during Jan 2011 to May **2019 by Manir Hossain Khan** et al [86], in some hospital of Dhaka, Bangladesh on 19 patients, it was concluded that total management of perforated appendicitis is excellent. So it is now considered as standard procedure.

In a study by **Bilal Tarar** and Sadaf Batool [87] comparing early appendectomy to conservative management in cases of appendicular mass at Combined Military Hospital, Lahore, from 01/03/2019 to 30/09/**2019**, 60 patients of both genders aged 16 to 70 years were included. The mean length of hospital stay was significantly shorter in patients undergoing early appendectomy compared to those managed conservatively (1.83 ± 0.83 days vs. 2.80 ± 1.54 days; p = 0.004). However, there was no significant difference in the frequency of perforation between the conservative management group and the early appendectomy group (16.7% vs. 10.0%; p = 0.448).

From Oct 2016 to Dec **2017,** Observational data was collected by **Mazhar Abbas et al** [88] from 50 patient of age between 13 to 25 years, having pain in right iliac fossa and admitted with the diagnosis of acute appendicitis. Diagnostic Laparoscopy helped in correctly diagnosing the associated incidental findings like ovarian cyst, Miliary abdominal TB, Endometriosis, ovarian cyst torsion etc.

In a **2019 study by Gaik S.** Quah and Guy D. Eslick [89] comparing laparoscopic appendectomy (LA) to open appendectomy (OA) for complicated appendicitis, involving 6,428 patients (LA = 3,174, OA = 3,254), several significant findings were observed. The rate of intra-abdominal abscess showed no significant difference between LA and OA (OR = 1.02). However, LA was associated with decreased overall post-operative morbidity (OR = 0.43,), reduced rates of wound infection (OR = 0.26), respiratory complications (OR = 0.25), and post-operative ileus/small bowel obstruction (OR = 0.65). Additionally, mortality rates were lower in the LA group compared to OA (OR = 0.15). LA was also

associated with significantly shorter hospital stays (6.4 days vs. 8.9 days) and earlier resumption of solid food (2.7 days vs. 3.7days).These findings strongly support that laparoscopic appendectomy should be preferred over open surgery for patients with complicated appendicitis, as it offers comparable rates of intra-abdominal abscess with significantly reduced morbidity, mortality, and length of hospital stay. The study also emphasizes that the diagnosis of complicated appendicitis during laparoscopy should not prompt conversion to open surgery, reinforcing laparoscopic approach as the optimal treatment modality in these cases.

**Kota Ramesh et al. (2020)** conducted a study on the use of laparoscopic appendectomy for managing early appendicular mass, a condition where the inflamed appendix adheres to adjacent tissues. The research involved 571 patients who underwent laparoscopic appendectomy, with 5.2% presenting with an appendicular mass. The study emphasized that immediate surgical intervention upon admission is a safe approach, reducing the need for a second hospitalization and lowering the risk of complications. The procedure was found to be feasible and effective, with low rates of intra-operative and post-operative complications. Overall, the study concluded that laparoscopic appendectomy is a beneficial alternative to conservative therapy for early appendicular mass, offering a shorter hospital stay and improved patient outcomes [(90)].

**Chaudhary et al. (2020)** conducted a study on the laparoscopic management of appendicular lumps. The research addresses the contentious issue of surgically managing appendicular lumps, focusing on the failure rates of conservative treatments and the necessity for urgent exploration in certain cases. Traditionally, the Ochsner-Sherren regime has been the standard approach for treating appendicular lumps. However, conservative management fails in 2-4% (up to 10%) of cases, necessitating urgent surgical intervention. Additionally, 10-20% of patients deteriorate within the first 48 hours, requiring emergency surgery, which is more complex and associated with

significant morbidity. The study highlights the complexities and risks involved in managing appendicular lumps and underscore the importance of timely surgical intervention when conservative treatments fail to prevent adverse outcomes [91].

In a **2020 study by Abdul Razaque Shaikh** and Aijaz Ahmed Shaikh [92] on the postoperative outcomes of early appendectomy for patients with appendicular mass using laparoscopic surgery, 73 patients were included. During the operations, appendicular abscess was found in 12 cases (16.43%), and perforated appendix in 10 cases (13.69%). Additionally, adhesions were encountered in 15 cases (20.5%), and difficulty in localizing the appendix in 6 cases (8.21%). The mean hospital stay was 4.91 days ± 1.65 (range: 3-9 days). Wound infection occurred in 15 cases (20.5%). The study concluded that early appendectomy can be safely performed in cases of appendicular mass without increased risk of mortality or morbidity. The outcomes also indicated benefits such as single hospitalization, shorter stays, and reduced treatment costs.

**Osama et al. (2021)** conducted a study to evaluate the effectiveness, and practicality of laparoscopic surgery compared to conservative management. The hospitalization duration of laparoscopic group had lesser (6.6±0.7 days) than conservative (10±1.6 days) group and better outcomes. [93]

**Nitinkumar Borkar et al. (2022)** conducted a systematic review comparing the harmonic scalpel in conventional techniques with laparoscopic method. The pooled analysis revealed that using the Harmonic Scalpel closure did not increase the occurence of complications compared to conventional methods. Additionally, the pooled analysis of operative time showed a significant reduction while using Harmonic Scalpel. [94]

**Sabry et al. (2023)** compared the clinical outcomes of laparoscopic appendectomy and open appendectomy in patients with complicated appendicitis. The study revealed significant differences in postoperative pain, time to resume oral intake, admission status, and return to normalcy. The mean operative time was shorter for OA at 91.4±11.99 minutes compared to 109.1±16.71 minutes for LA. The study concluded that, given the clinical outcomes, laparoscopy should be considered for complicated appendicitis. Concerns about intraabdominal collections should not prevent the widespread use of laparoscopic procedures, provided proper precautions are taken [(95)].

**Anurag Surabhi et al. (2023)** evaluated the predictors of laparoscopic appendectomy in complicated appendicitis, involving 87 patients. The study monitored demographic features, duration of surgery, hospital stay across different age groups and postoperative pain. Findings indicated that acute complicated appendicitis was most common in individuals over 42 years old. Laparoscopic appendectomy, performed on all 87 patients, showed a mean operating time of 87.9 minutes, average postoperative pain score of 3.9, and an average hospital stay of 6.7 days. Postoperative complications included drain site infection, enterocutaneous fistula and intra-abdominal abscess. The study concluded that laparoscopic method is a alternative for treating complicated appendicitis. [(96)]

# MATERIAL AND METHODS

It is an observational prospective study done on patients undergoing Laparoscopic management of Appendicular mass in the department of General Surgery Dayanand medical college and hospital, Ludhiana during a 2-year period from October 2022 to October 2024.

**INCLUSION CRITERIA:**

1. All patients diagnosed with appendicular mass(clinically palpable/ on imaging modalities/intra op finding) Undergoing laparoscopic appendicectomy
2. Patients who are 18 years old or above
3. Patients of both genders.

**EXCLUSION CRITERIA:**

1. Pregnant women
2. Other masses of abdominal wall, urological or gynecological origin
3. Patients presenting with peritonitis
4. Patients not consenting to be a part of the study

PRE-OPERATIVE WORK UP

Routine investigations including hemogram,renal function tests, coagulation profile ,chest x-ray and electrocardiogram are done in all patients. Patients are kept nil per orally to solids 8hours before surgery and clear liquids 2 hours prior.

All procedures are done under general anesthesia and catheterization is done before the start of procedure.

SURGICAL STEPS:

1. POSITION OF THE PATIENT

   Patient is placed supine on operating table with left arm tucked to allow room for both surgeon and assistant. Camera monitor is placed to the right.

2. PORT PLACEMENT

   According to the principle of triangulation, in most cases 3 port technique is used: umbilical port that is the 10mm camera port and two other 5mm working ports are that inserted into the suprapubic region and the left lower quadrant region such that port locations direct the camera and the instruments towards the right lower quadrant for the optimal visualization of appendix.

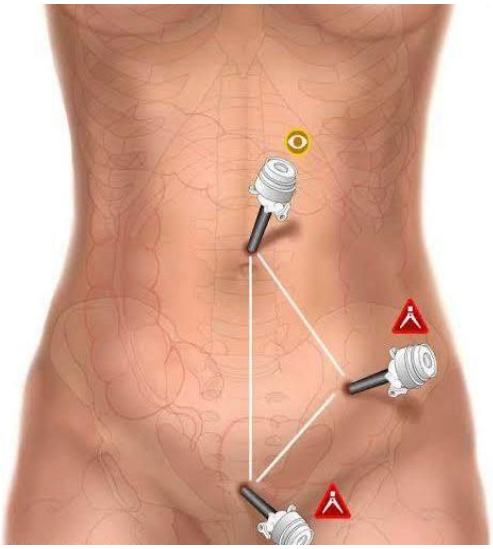

**FIGURE 9: TROCAR PLACEMENTS FOR LAPAROSCOPIC APPENDECTOMY. A CAMERA PORT (10mm) IN THE UMBILICUS AND TWO WORKING PORTS (5mm) IN THE SUPRAPUBIC AND LEFT LOWER QUADRANT FOR OPTIMAL VISUALISATION OF APPENDIX**

3. Prior to incision a nasogastric tube and a urinary catheter are inserted.

4. INCISION

   1 cm incision made superior or inferior to umbilicus and pneumoperitoneum is created using a Veress needle. Trocar is then inserted through the incision. 5mm suprapubic port is placed in the midline. Another 5mm port is placed in left lower quadrant. Laparoscope is inserted in 10mm port and the

abdomen is thoroughly visualised. Instruments are inserted. Surgeon operates the two dissecting instruments and assistant operates the laparoscope.

5. Appendix is identified at the base of caecum at the confluence of teniae coli merging into ileum. Any adhesion to the surrounding structures can be lysed with the combination of blunt and sharp dissection supplemented with electrocautery agents. If retrocaecal appendix is encountered division of the lateral peritoneal attachments of the caecum to the abdominal wall often improves visualization.

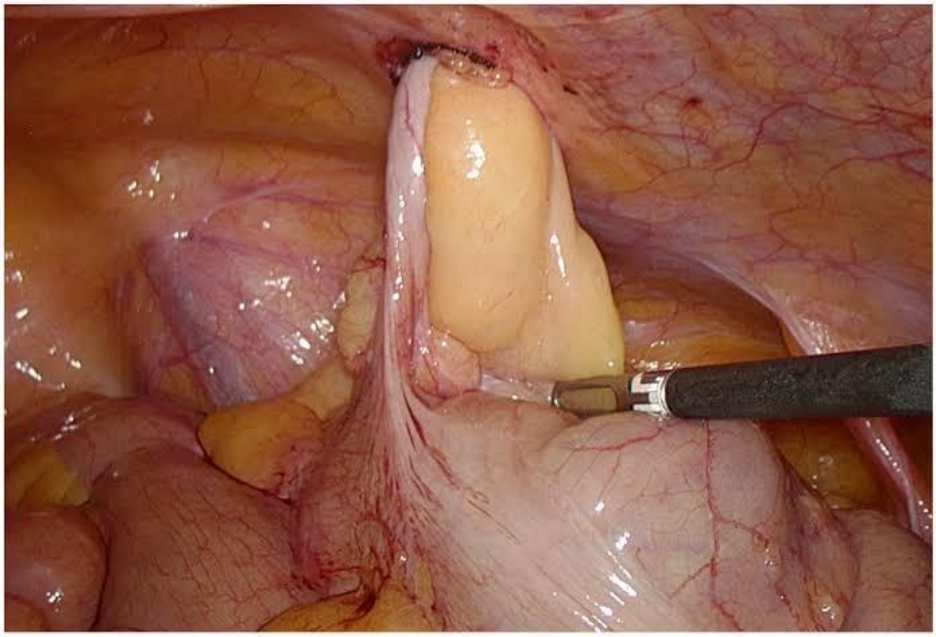

**FIGURE 10: CASE OF APPENDICULAR MASS WITH DENSE ADHESIONS AT THE ANTERIOR WALL. A CLINICAL LUMP WAS PALPABLE IN THIS CASE PRE-OPERATIVELY**

6. Once the appendix has been properly visualized and sufficiently mobilized, it can be gently grasped with a babcock clamp or with alternative laparoscopic instruments through suprapubic port

and retracted anteriorly. Dissecting forceps are then used to create a window in the meso-appendix at the appendiceal base. Then the mesoappendix is secured using either electrocautery device or clips.

7. The appendix is secured using endoloop or using intracorporeal suturing techniques. Appendix is then placed in retrieveral bag and removed through the umbilical port to minimize risk of wound infection.

8. The operative field is inspected for hemostasis and can be irrigated with saline although irrigation was not necessary in most of the cases.

9. Abdomen is then desufflated, skin of the three port sites was closed with3-0 ethilon interrupted sutures and opsite dressing is applied.

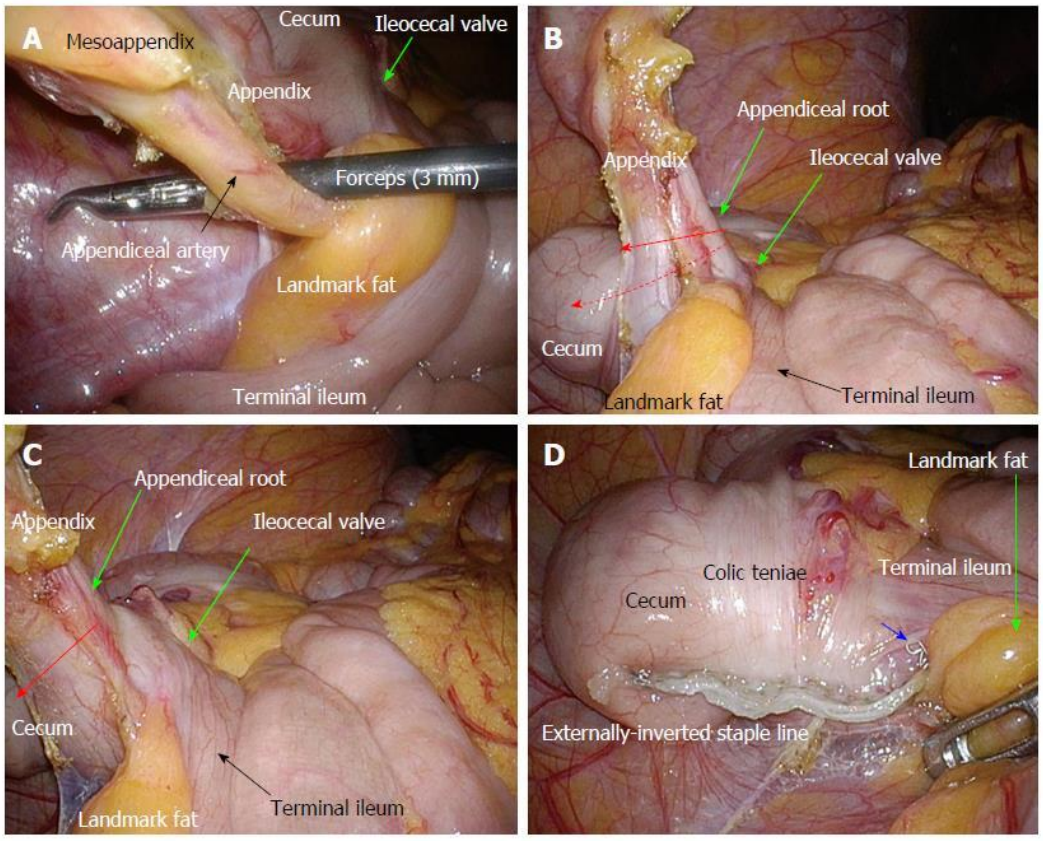


**FIGURE 11: LAPAROSCOPIC APPENDECTOMY. A: APPENDICEAL VESSELS CLEARLY DISSECTED B: TOTAL RESECTION OF THE APPENDICEAL ROOT; C: THE ILEOCECAL VALVE RECOGNIZED; D: THE EXTERNALLY-INVERTED STAPLE LINE**

## STATISTICAL ANALYSIS

Data was described in terms of range; mean ±standard deviation (± SD), frequencies (number of cases) and relative frequencies (percentages) as appropriate. All statistical calculations was done using (Statistical Package for the Social Science) SPSS 21version (SPSS Inc., Chicago, IL, USA) statistical program for Microsoft Windows.

# OBSERVATIONS AND RESULTS

The study was done on 55 patients undergoing Laparoscopic management of Appendicular mass in the department of General Surgery Dayanand medical college and hospital, Ludhiana during a 2-year period from October 2022 to October 2024.

**Following are the results observed:-**

**PATIENT DEMOGRAPHICS**

**1. AGE**

7 (12.7%) out of 55 patients were above 60 years of age. 9(16.4%) patients were between 51-60 years of age, 8(14.5%) between 41-50 years of age and 10 (18.2%) were between 31-40 years of age. Majority of patients were below 30 years of age that is 21(38.2%) out of 55 patients.

**TABLE 1: AGE GROUP (IN YEARS)**

| **Age group** | No. of cases | Percentage |
|---|---|---|
| < 30 | 21 | 38.2% |
| 31-40 | 10 | 18.2% |
| 41-50 | 8 | 14.5% |
| 51-60 | 9 | 16.4% |
| > 60 | 7 | 12.7% |
| Total | 55 | 100.0% |

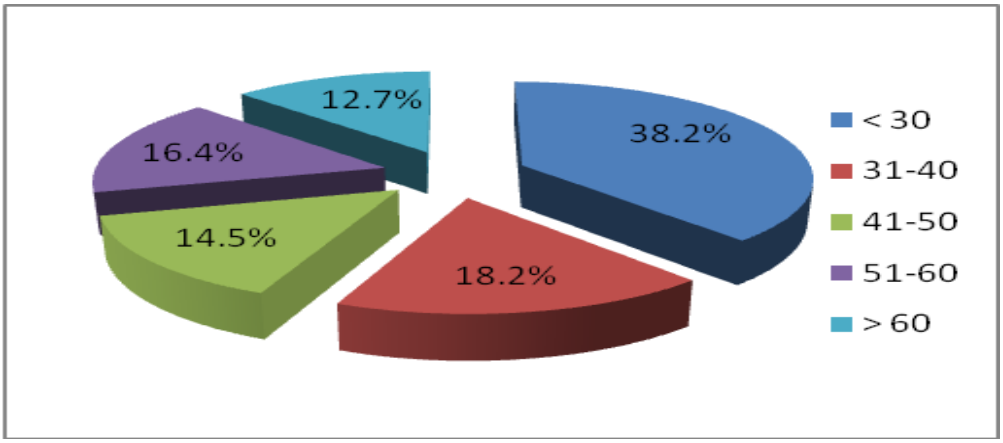


**FIGURE 12: AGE GROUP (IN YEARS)**

## 2.SEX

Males were the majority sex among the patients in the study 32 (58.2%) out of 55 patients.

**TABLE 2: SEX DISTRIBUTION**

| **SEX** | No. of cases | Percentage |
|---|---|---|
| F | 23 | 41.8% |
| M | 32 | 58.2% |
| Total | 55 | 100.0% |

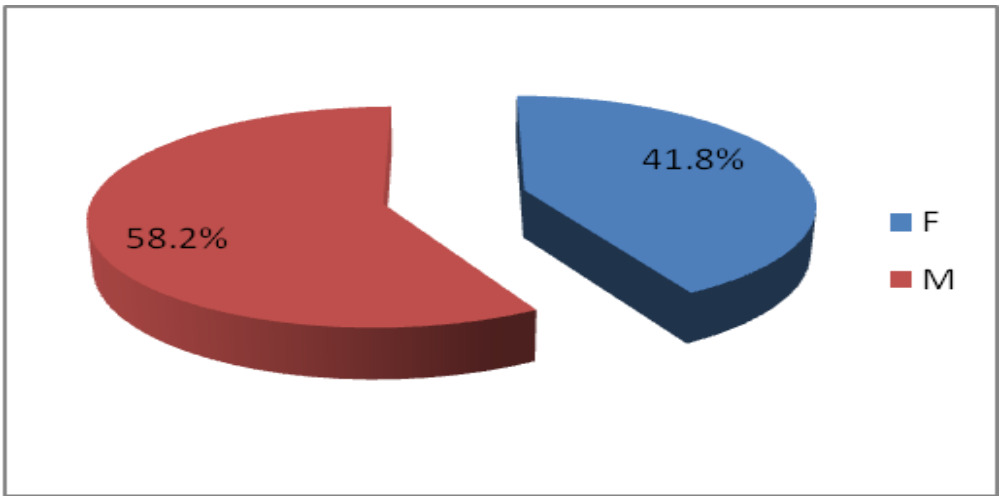


**FIGURE 13: SEX DISTRIBUTION**

## 3.SYMPTOMS

All 55 patients presented with pain abdomen. Pain wasacute in 20 patients (36.4%) that was the first of attack of appendicitis. Majority of the patients in our study presented with subacute pain that is intermittent pain occurring over a longer duration.

**TABLE 3: DURATION OF PAIN ABDOMEN**

| **PAIN ABDOMEN** | No. of cases | Percentage |
|---|---|---|
| ACUTE | 20 | 36.4% |
| SUBACUTE | 35 | 63.6% |
| Total | 55 | 100.0% |

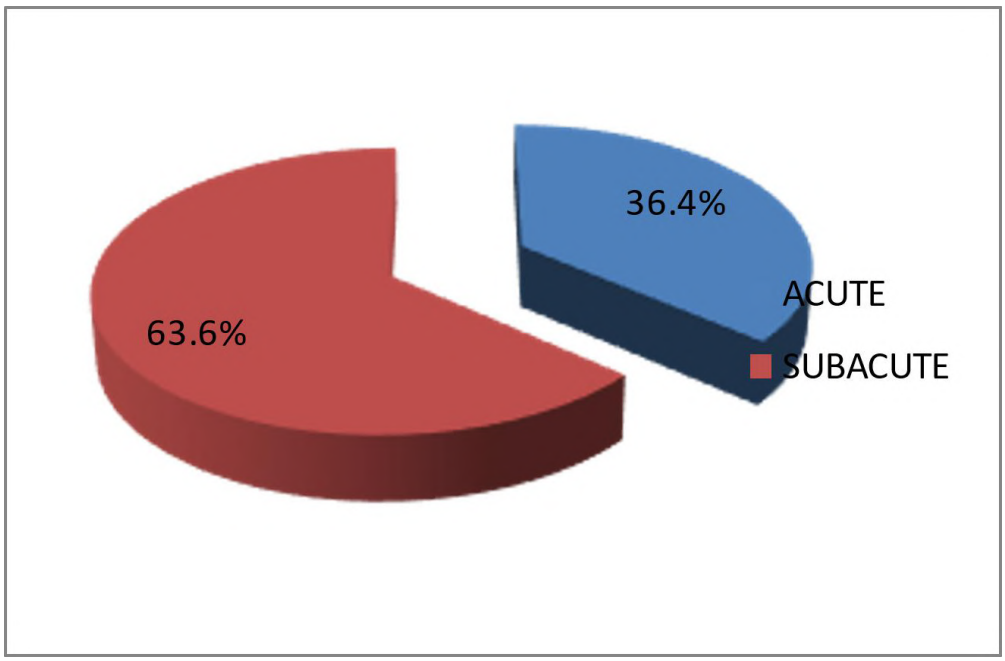


**FIGURE 14: DURATION OF PAIN ABDOMEN**

## 4. OTHER SYMPTOMS

Patients presented with fever in 34.5% (19 out of 55) of cases,vomiting in 20% (11 out of 55) of cases and loose stools in 14.5% (8 out of 55) of cases. Other symptoms were present in less than 10% of cases including nausea, dysuria and constipation.

**TABLE 4: OTHER SYMPTOMS**

| **SYMPTOMS** | No. of cases | Percentage |
|---|---|---|
| FEVER | 19 | 34.5% |
| VOMITTING | 11 | 20.0% |
| DYSURIA | 2 | 3.6% |
| CONSTIPATION | 3 | 5.5% |
| NAUSEA | 5 | 9.1% |
| LOOSE STOOL | 8 | 14.5% |

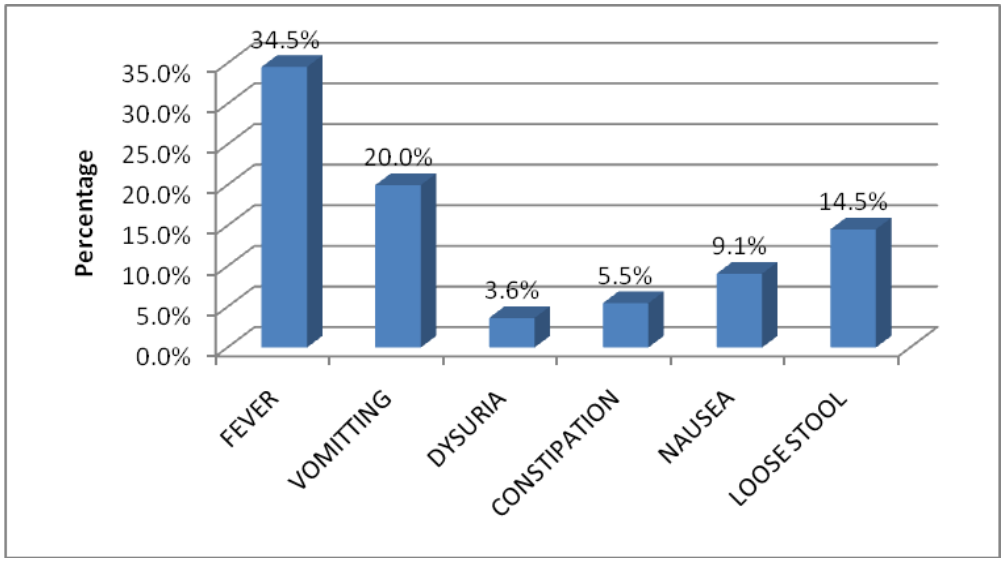


**FIGURE 15: OTHER SYMPTOMS**

5.**DURATION OF SYMPTOMS**

67.3%patients (37out of 55 cases) presented within 15 days of occurrence of symptoms. 12 patients (21.8%) presented within 16-30 days and only 10.9% of cases presented after 30 days of starting of symptoms.

**TABLE 5: DURATION OF OTHER SYMPTOMS**

| **DURATION** | No. of cases | Percentage |
|---|---|---|
| < 15 | 37 | 67.3% |
| 16-30 | 12 | 21.8% |
| > 30 | 6 | 10.9% |
| Total | 55 | 100.0% |

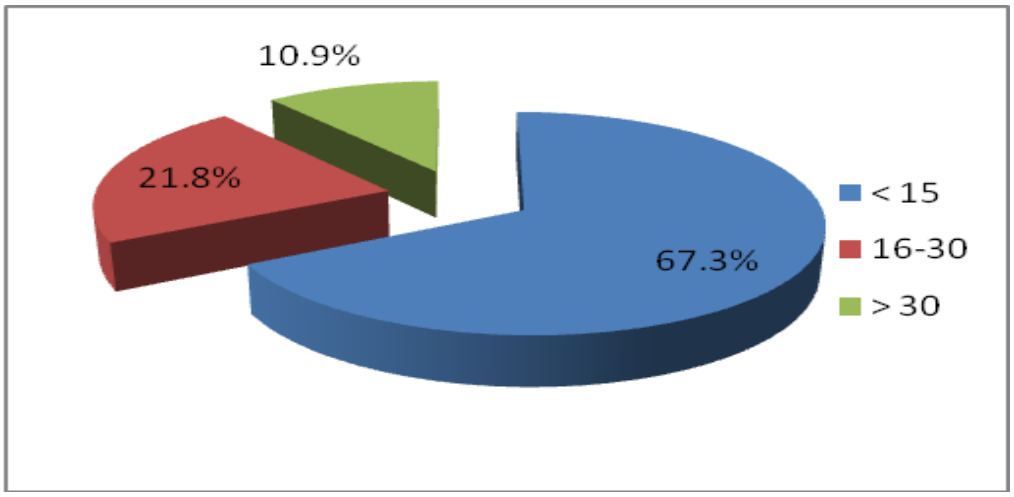


**FIGURE 16: DURATION OF OTHER SYMPTPOMS**

6.**TENDERNESS AND REBOUND TENDERNESS**

All patients presented with tenderness in the right iliac fossa region with rebound tenderness being present in 60% of cases.

**TABLE 6: TENDERNESS**

| **TENDERNESS** | No. of cases | Percentage |
|---|---|---|
| YES | 55 | 100.0% |

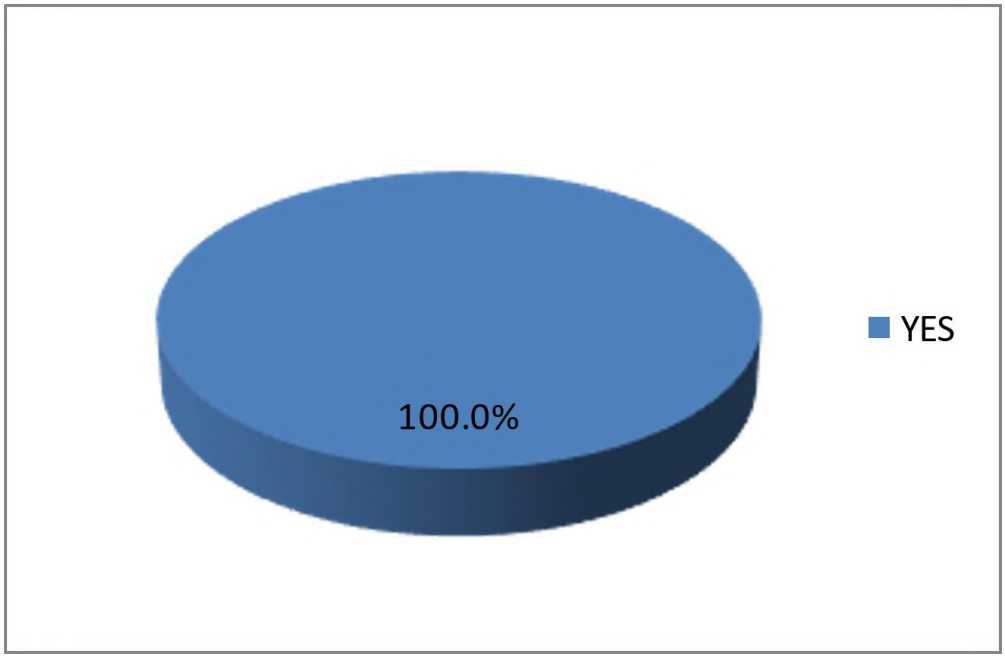


**FIGURE 17: TENDERNESS**

**TABLE 7: REBOUND TENDERNESS**

| **REBOUND TENDERNESS** | No. of cases | Percentage |
|---|---|---|
| NO | 22 | 40.0% |
| YES | 33 | 60.0% |
| Total | 55 | 100.0% |

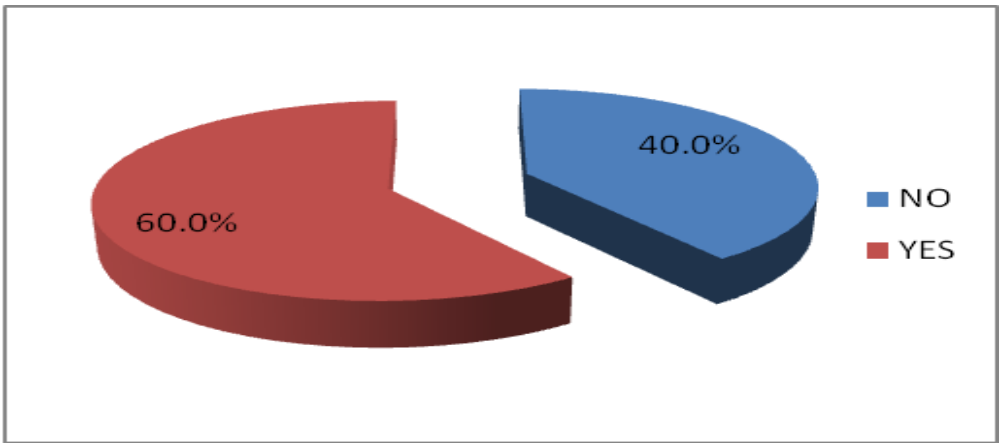


**FIGURE 18: REBOUND TENDERNESS**

7.**CO-MORBIDITIES**

In majority of patients 81.8% (45 out of 55) no co-morbidity was present. Hypertension was the most common co-morbidity associated. Some of patients associated with multiple co-morbidities were associated with complications after surgery like stoma formation and wound site infection.

**TABLE 8: CO-MORBIDITIES**

| **COMORBIDITIES** | No. of cases | Percentage |
|---|---|---|
| BRONCHIAL ASTHMA | 1 | 1.8% |
| CAD, CABG | 1 | 1.8% |
| HYPERTENSION | 4 | 7.3% |
| MORBID OBESITY | 1 | 1.8% |
| NO | 45 | 81.8% |
| TYPE 2 DM | 1 | 1.8% |
| TYPE 2 DM, HYPERTENSION, CAD | 1 | 1.8% |
| TYPE 2 DM, HYPERTENSION, PANCREATITIS | 1 | 1.8% |
| Total | 55 | 100.0% |

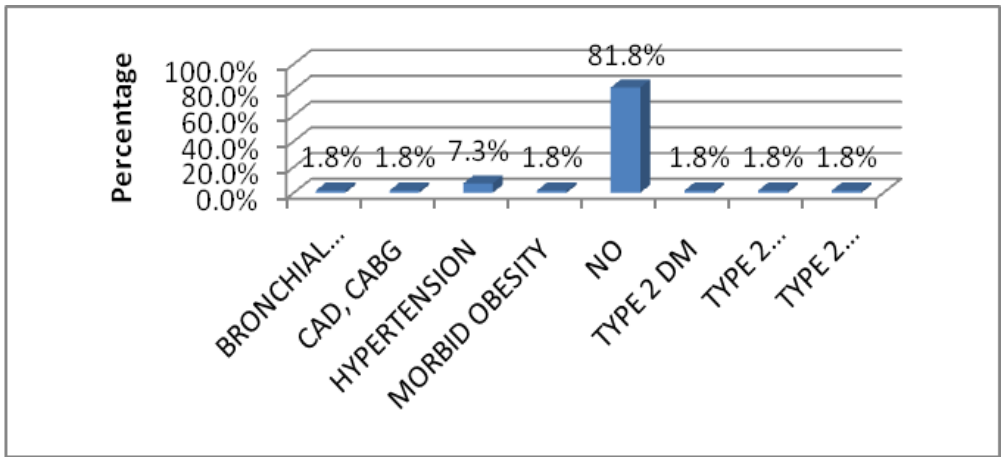


**FIGURE 19: CO-MORBIDITIES**

7. PAST OPERATIVE HISTORY:

Majority of patients (38 out of 55 patients) had no previous surgeries.

**TABLE 9: PAST HISTORY OF SURGERY**

| **PAST HISTORY OF SURGERY** | No. of cases | Percentage |
|---|---|---|
| BL INGUINAL HERNIA | 1 | 1.8% |
| CABG | 1 | 1.8% |
| FISTULECTOMY | 2 | 3.6% |
| FRACTURE FEMUR | 1 | 1.8% |
| HAEMORRHOIDECTOMY | 2 | 3.6% |
| LAP CHOLECYSTECTOMY | 3 | 5.5% |
| LSCS | 1 | 1.8% |
| NO | 38 | 69.1% |
| PTCA STENTING | 1 | 1.8% |
| RIGHT ELBOW PLATING | 1 | 1.8% |
| RIGHT INGUIANL HERNIOPLASTY | 1 | 1.8% |
| RIGHT ORCHIDECTOMY FOR RIGHT TESTICULAR MASS | 1 | 1.8% |
| SEPTOPLASTY | 1 | 1.8% |
| TUBECTOMY | 1 | 1.8% |
| Total | 55 | 100.0% |

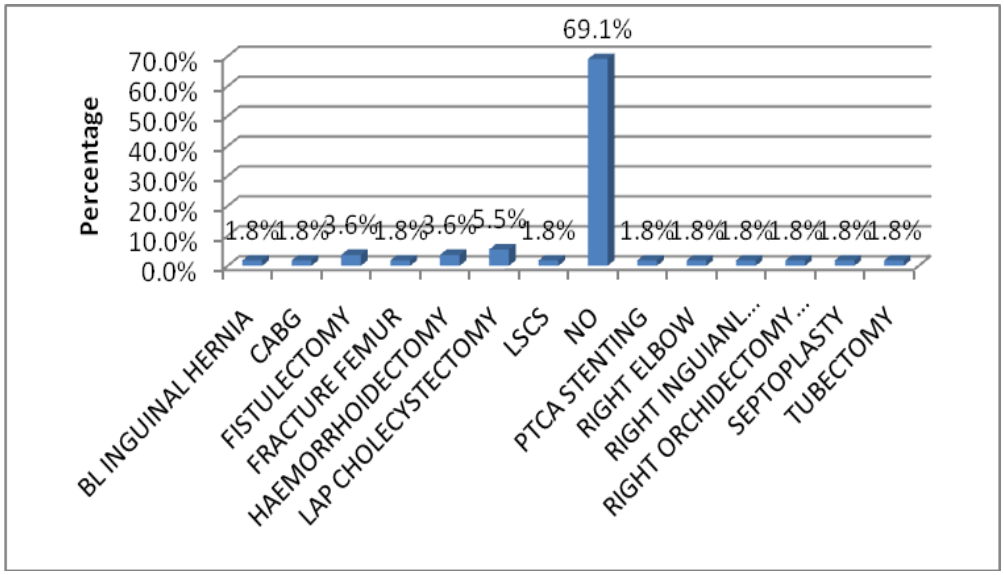


**FIGURE 20: PAST HISTORY OF SURGERY**

## 8. ULTRASOUND/CT FINDINGS

In all cases periappendicular collection was found with fluid in the pelvis being present in 56.4% of cases. Majority of the cases with fluid in the pelvis presented with rebound tenderness on examination. In some complicated cases: caecal/ appendicular gangrene and intestinal obstruction presenting as dilated bowel loops on ultrasound/CT abdomen was present in 9cases and 1 case respectively.

**TABLE 10: ULTRASOUND /CT FINDINGS**

| **USG FINDING/ CT ABDOMEN** | No. of cases | Percentage |
|---|---|---|
| Periappendicular collection | 55 | 100.0% |
| Caecal/Appendicular Gangrene | 9 | 16.4% |
| Pelvic Collection | 31 | 56.4% |
| Intestinal Obstruction | 1 | 1.8% |

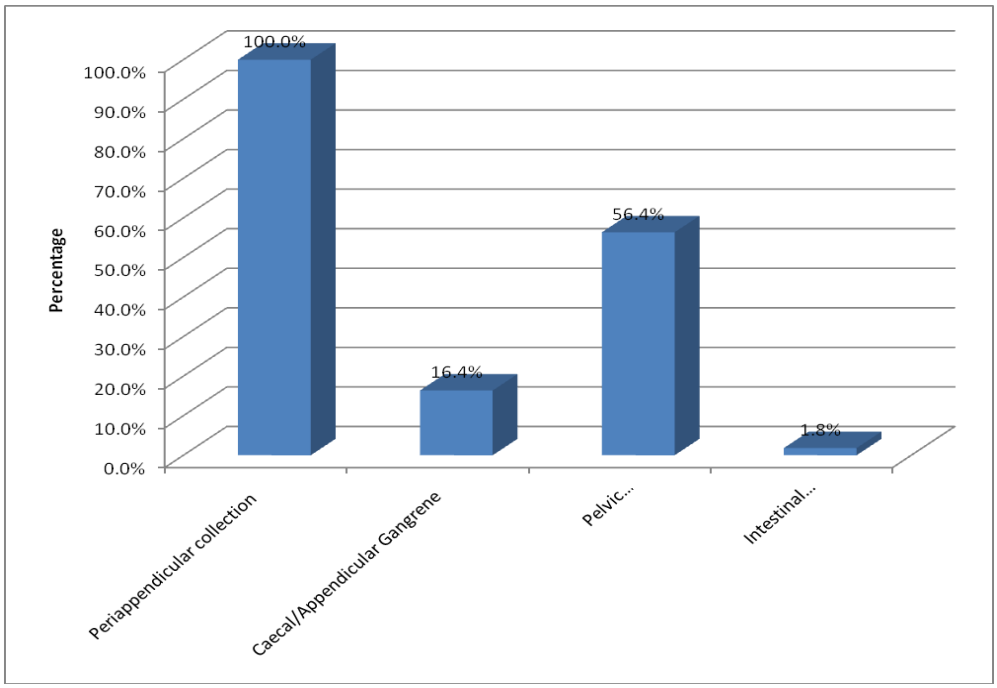


**FIGURE 21: ULTRASOUND/CT FINDINGS**

## 9. INTRA-OPERATIVE FINDINGS

### A) LOCATION OF APPENDIX

Retrocaecal location of appendix was found in majority of cases in 37 (67.3% of cases). Pelvic location was found in 25.5% of cases intra-operatively. Only in less than 10% of cases appendix was found in paracaecal and subcaecallocatrions.

**TABLE 11: LOCATION OF APPENDIX**

| **INTRA OPERATIVE FINDING_ OF APPENDIX** | No. of cases | Percentage |
|---|---|---|
| PARACAECAL | 1 | 1.8% |
| PELVIC | 14 | 25.5% |
| RETROCAECAL | 37 | 67.3% |
| SUBCAECAL | 3 | 5.5% |
| Total | 55 | 100.0% |

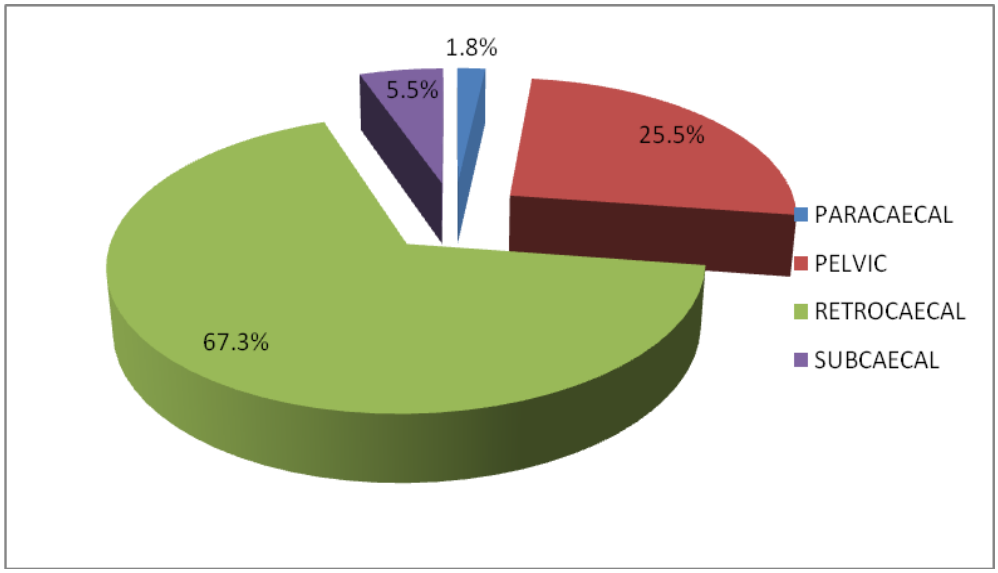


**FIGURE22: LOCATION OF APPENDIX**

## B) SITE OF RUPTURE

In majority of patients, rupture was found at the tip in 67.3% of patients. Appendix rupture at the base was found in 20% of patients (11 out of 55) and in only 7 cases (12.7%) rupture was found in middle of appendix.

**TABLE 12: SITE OF RUPTURE OF APPENDIX**

| **SITE OF RUPTURE** | No. of cases | Percentage |
|---|---|---|
| BASE | 11 | 20% |
| MIDDLE | 7 | 12.7% |
| TIP | 37 | 67.3% |
| Total | 55 | 100.0% |

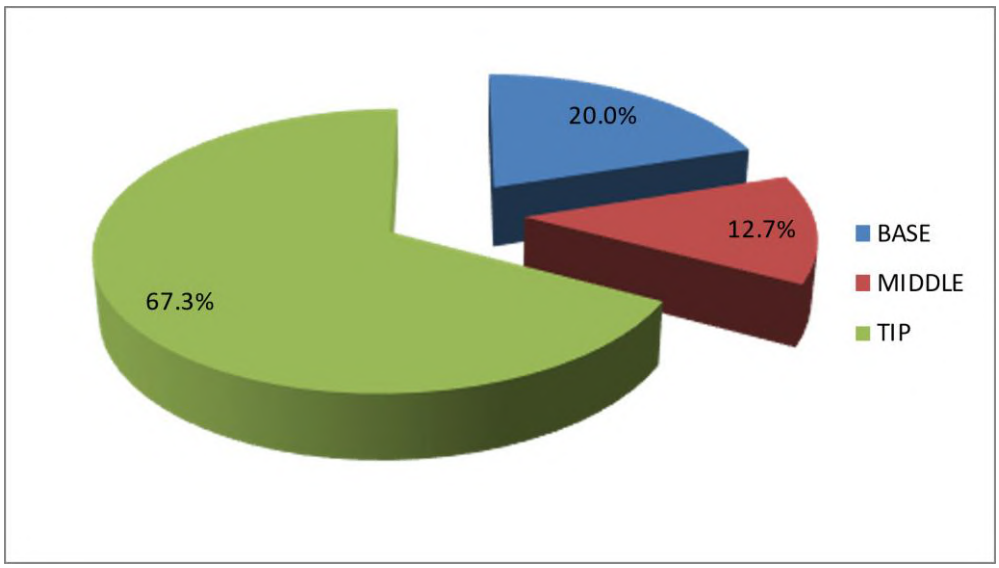


**FIGURE 23: SITE OF RUPTURE OF APPENDIX**

## C) ADHERENCE TO INTRA-ABDOMINAL STRUCTURES

Among the structures adhered to the appendix, flimsy adhesions with the omentum were found in majority of cases. Among other structures adherence to caecam and ileum were found in 63.6% and 43.6% of cases respectively.

- **OMENTUM-**98.2% of patients.

**TABLE 13 A: APPENDIX ADHERENT TO OMENTUM**

| **ADHERENT TO OMENTUM** | No. of cases | Percentage |
|---|---|---|
| NO | 1 | 1.8% |
| YES | 54 | 98.2% |
| Total | 55 | 100.0% |

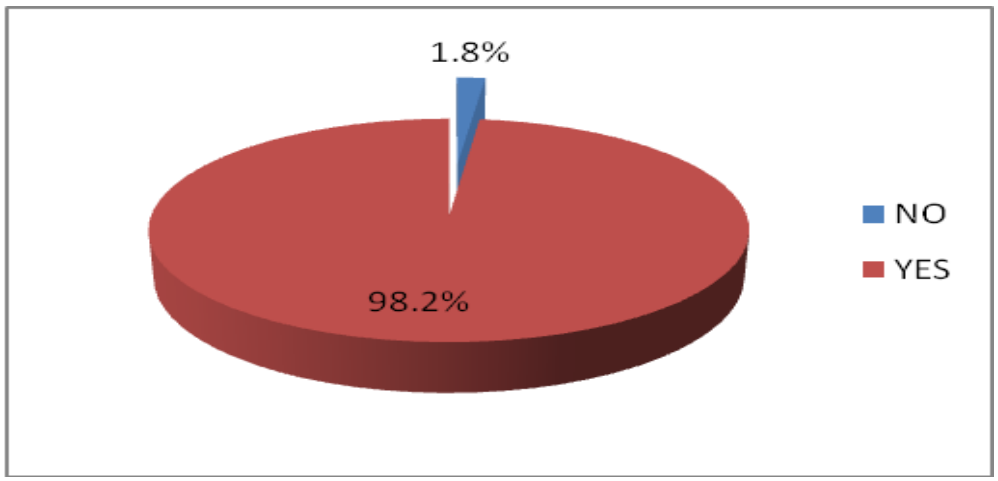


**FIGURE 24A: ADHERENCE OF APPENDIX TO OMENTUM**

- **CAECAM-**63.6% of patients

**TABLE 13B: APPENDIX ADHERENT TO CAECAM**

| **CAECUM** | No. of cases | Percentage |
|---|---|---|
| NO | 20 | 36.4% |
| YES | 35 | 63.6% |
| Total | 55 | 100.0% |

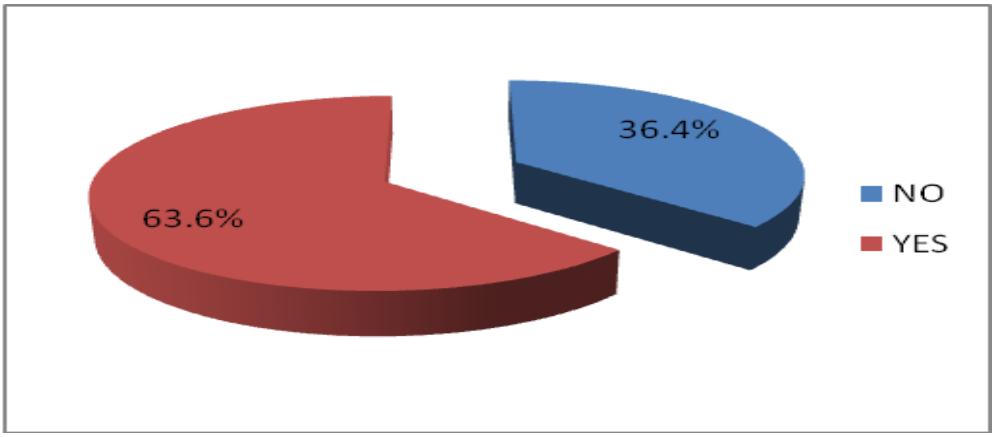


**FIGURE 24B: ADHERENCE OF APPENDIX TO CAECAM**

- **ILEUM**-43.6% of patients

**TABLE 13C: APPENDIX ADHERENT TO ILEUM**

| **ILEUM** | No. of cases | Percentage |
|---|---|---|
| NO | 31 | 56.4% |
| YES | 24 | 43.6% |
| Total | 55 | 100.0% |

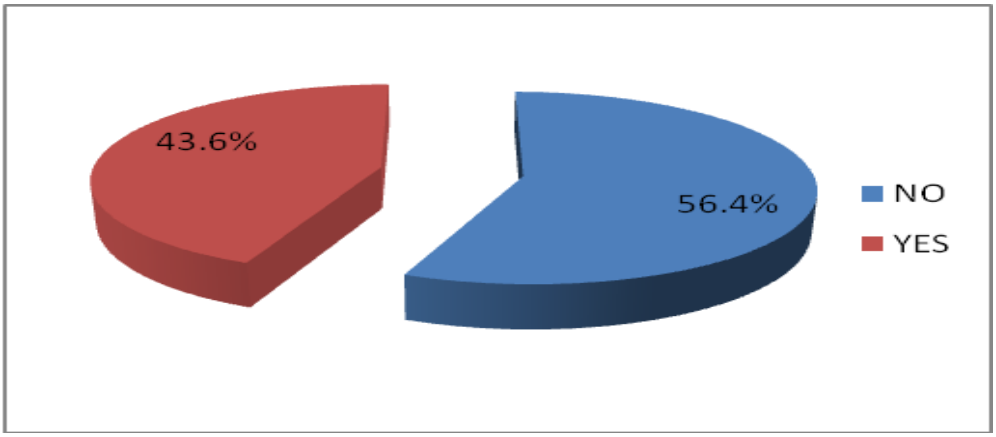


**FIGURE 24C: ADHERENCE OF APPENDIX TO ILEUM**

- **COLON-**5.5% of patients

**TABLE 13D: APPENDIX ADHERENT TO COLON**

| **COLON** | No. of cases | Percentage |
|---|---|---|
| NO | 52 | 94.5% |
| YES | 3 | 5.5% |
| Total | 55 | 100.0% |

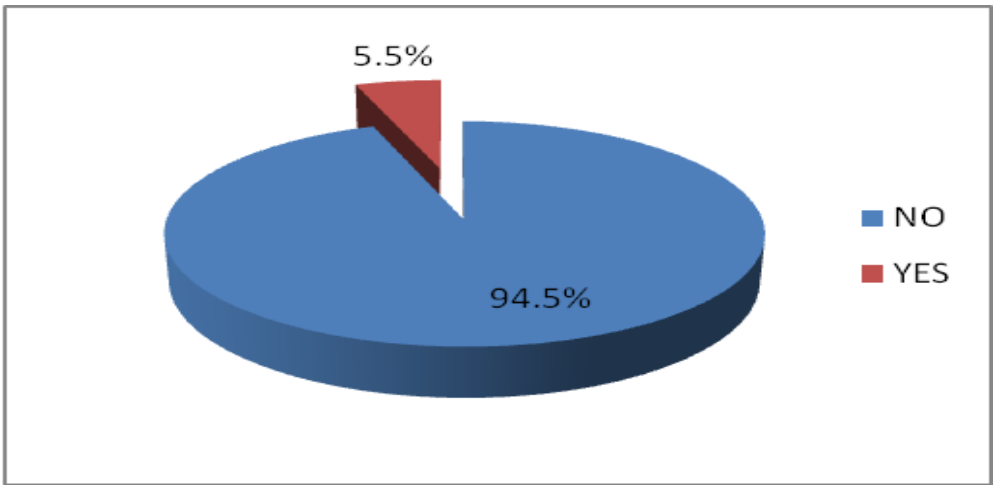


**FIGURE 24D: APPENDIX ADHERENT TO COLON**

## D) DIFFICULTY IN ADHESIOLYSIS

Intraoperatively difficulty in adhesiolysis was found in 19 cases (34.5%) when appendix was adherent to more than one intra-abdominal structures. It was found to be closely associated with caecal gangrene with difficult in adheosiolysis present in 8 out of 9 cases of caecal gangrene.

**TABLE 14: DIFFICULT ADHESIOLYSIS OF APPENDIX**

| **DIFFICULTY ADHESIOLYSIS** | No. of cases | Percentage |
|---|---|---|
| NO | 36 | 65.5% |
| YES | 19 | 34.5% |
| Total | 55 | 100.0% |

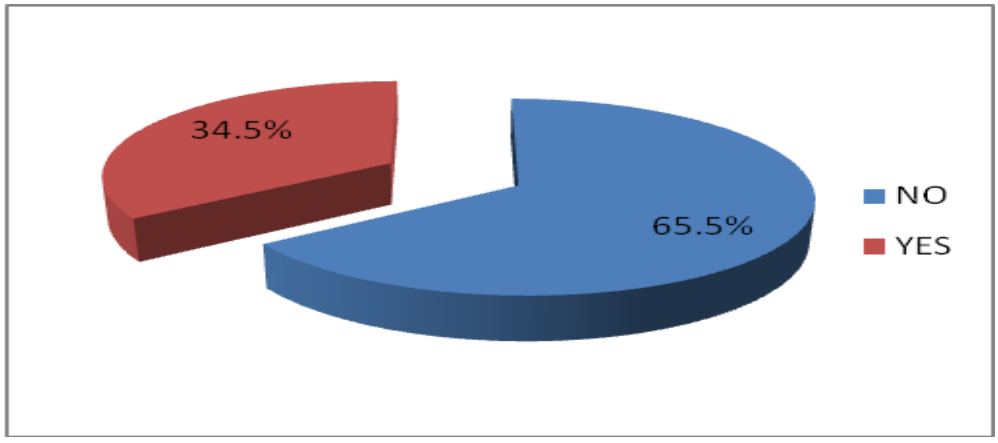


**FIGURE 25: DIFFICYLT ADHESIOLYSIS OF APPENDIX**

## E) DIFFICULTY IN LOCALISING APPENDIX

There was difficulty in localizing appendix in 13 cases (23.6%) mostly in retrocaecal location in 8 (out of 13 cases) cases. In few cases where the appendix was located in subcaecal and pelvis locations there was difficulty in localization. It had a close association with caecal gangrene with difficult localization in 9 out of 9 cases with caecal gangrene.

**TABLE 15: DIFFICULT LOCALISATION OF APPENDIX**

| **DIFFICULTY LOCALISING APPENDIX** | No. of cases | Percentage |
|---|---|---|
| NO | 42 | 76.4% |
| YES | 13 | 23.6% |
| Total | 55 | 100.0% |

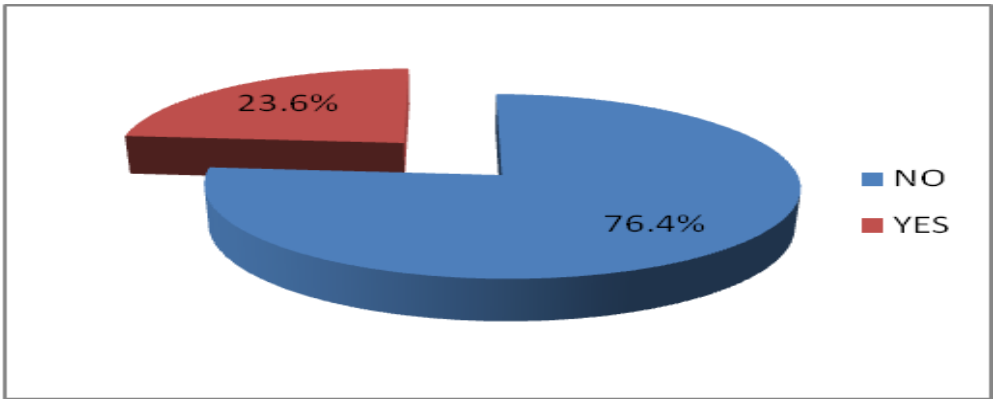


**FIGURE 26: DIFFICULT LOCALISATION OF APPENDIX**

## F) CAECAL GANGRENE

In complicated cases of appendicitis, leading to formation of appendicular mass; caecal gangrene was found in 9 cases intraoperatively. There was found to be a close correlation between caecal gangrene and various complications that were being studied for the purpose of this study such as difficulty in adhesiolysis and difficulty in localization. All four cases of laparoscopic to open conversion were associated with caecal gangrene. This was, impart due to the fact that cases with caecal gangrene were likely to required interventions such as caecal base suturing or reinforcement or close-sharp dissection. Stoma was formed in one of these where the caecal gangrene was so intensive that there was doubt over of the viability of suture line. Majority (5 out of 9) involving caecal base gangrene, however were treated successfully laparoscopically using intracorporeal suturing techniques.

**TABLE 16: CAECAL GANGRENE FOUND INTRAOPERATIVELY**

| CAECAL GANGRENE | No. of cases | Percentage |
|---|---|---|
| NO | 46 | 83.6% |
| YES | 9 | 16.4% |
| Total | 55 | 100.0% |

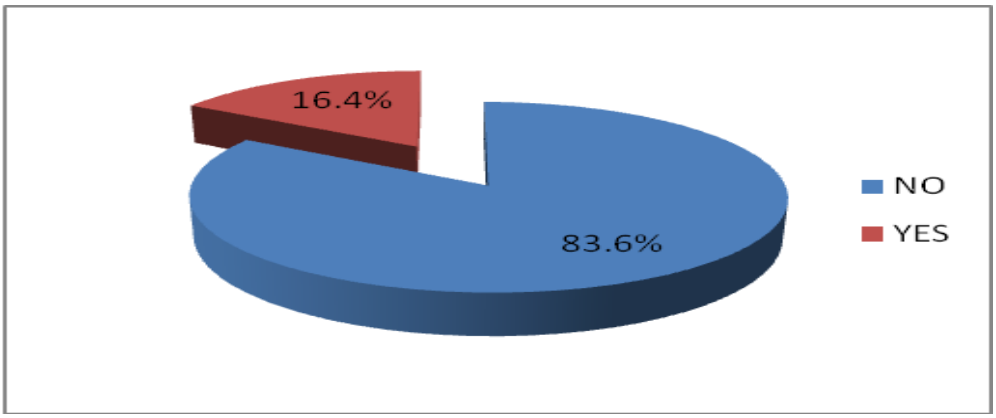


**FIGURE 27: CAECAL GANGRENE FOUND INTRAOPERATIVELY**

## 10. OPERATING TIME

Mean operative time was 97mins in lap appendectomy. In 4 cases (7.3%) the operative time was >150 minutes. In all these cases difficulty in adheisiolysis and difficulty in localization was found.

**TABLE 17A: OPERATING TIME (IN MINUTES)**

| OPERATING TIME (MINUTES) | No. of cases | Percentage |
|---|---|---|
| < 90 | 24 | 43.6% |
| 90-120 | 22 | 40.0% |
| 12-150 | 5 | 9.1% |
| > 150 | 4 | 7.3% |
| Total | 55 | 100.0% |

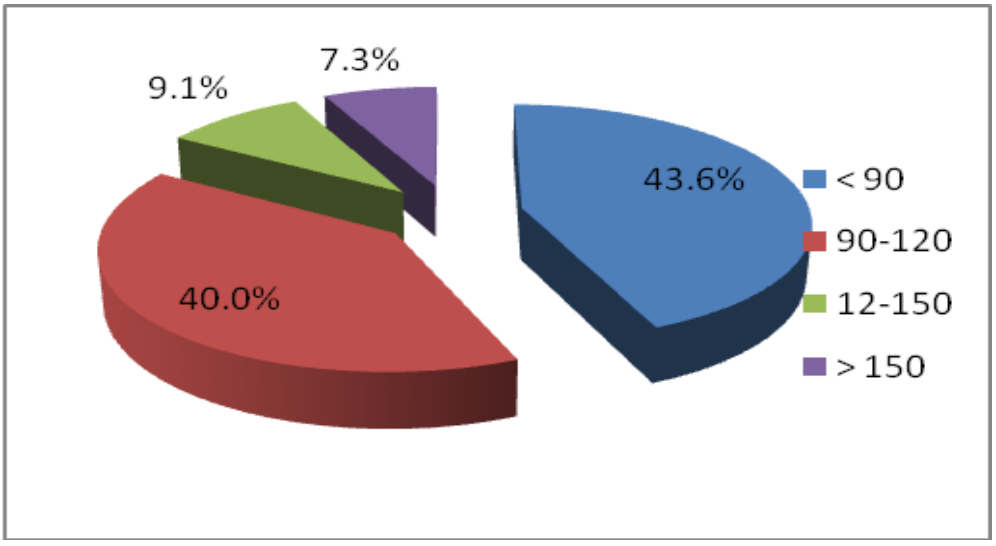


**FIGURE 28A: OPERATING TIME (IN MINUTES)**

**TABLE 17B: MEAN OPERATING TIME (IN MINUTES)**

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| OPERATING TIME (MINUTES) | 55 | 59.00 | 155.00 | 97.53 | 24.88 |

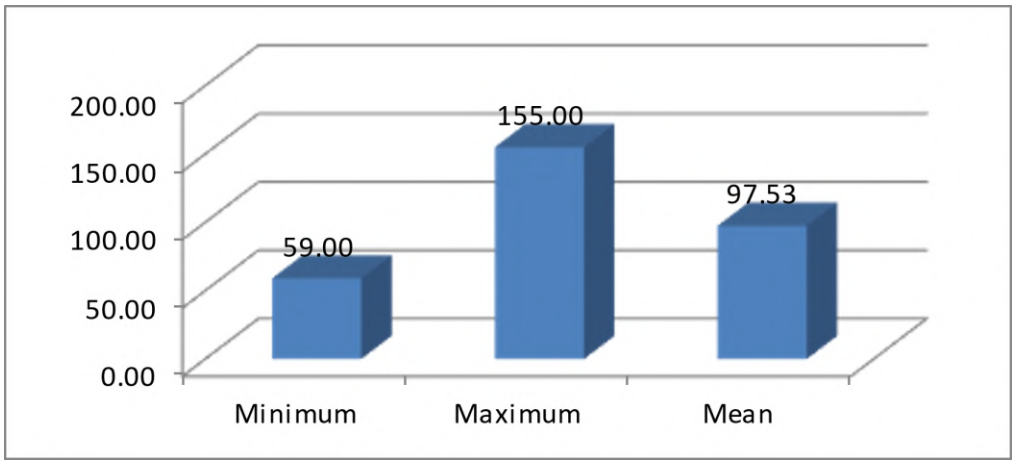


**FIGURE 28B: MEAN OPERATING TIME (IN MINUTES)**

## 11. NEED FOR LAPROSCOPIC TO OPEN CONVERSION

In 4 cases, there was need of conversion from laparoscopic to open surgery.Caecal gangrene was found to be present in all four of these cases with four out of nine cases of caecal gangrene requiring open conversion. It was also seen to be closely associated with other factors such in difficulty in localizing in appendix and difficultly in adhesiolysis. Cases that required open conversion were seen to have a longer duration of hospital stay, more incidence of postop ileus and a greater incidence of postop complications with wound site infection being seen in two out of four cases that required open conversion. Operative time was comparatively longer in these cases.

**TABLE 18: LAPROSCOPIC TO OPEN CONVERSION**

| **NEED FOR LAPROSCOPIC TO OPEN CONVERSION** | No. of cases | Percentage |
|---|---|---|
| NO | 51 | 92.7% |
| YES | 4 | 7.3% |
| Total | 55 | 100.0% |

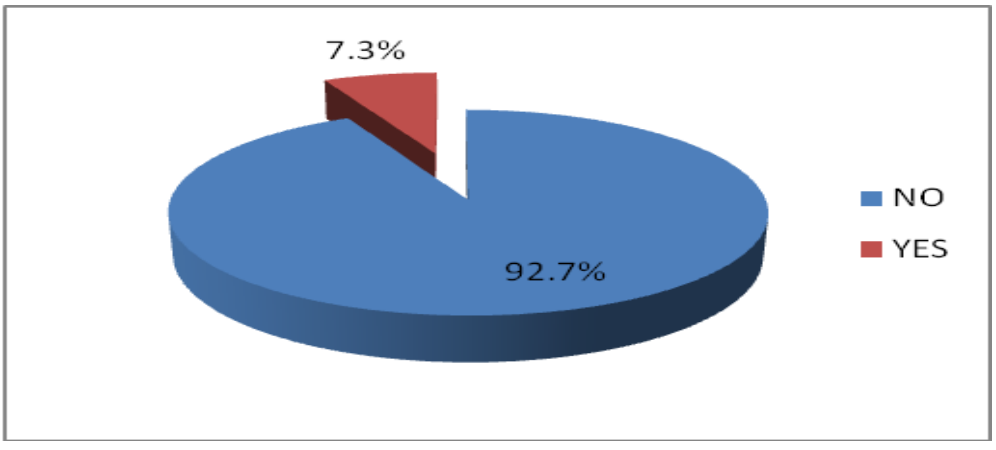


**FIGURE 29: LAPROSCOPIC TO OPEN CONVERSION**

## 12. NEED FOR STOMA FORMATION

There was need for stoma formation in one of the cases. Intraoperatively the appendix was densely adhered to surrounding structure with extensive caecal gangrene. this case required open conversion followed by fashioning of proximal loop ileostomy. This patient also suffered from subsequent wound site infection that was managed with proper irrigation and dressing.

**TABLE 19: STOMA FORMATION**

| **NEED FOR STOMA FORMATION** | No. of cases | Percentage |
|---|---|---|
| NO | 54 | 98.2% |
| YES | 1 | 1.8% |

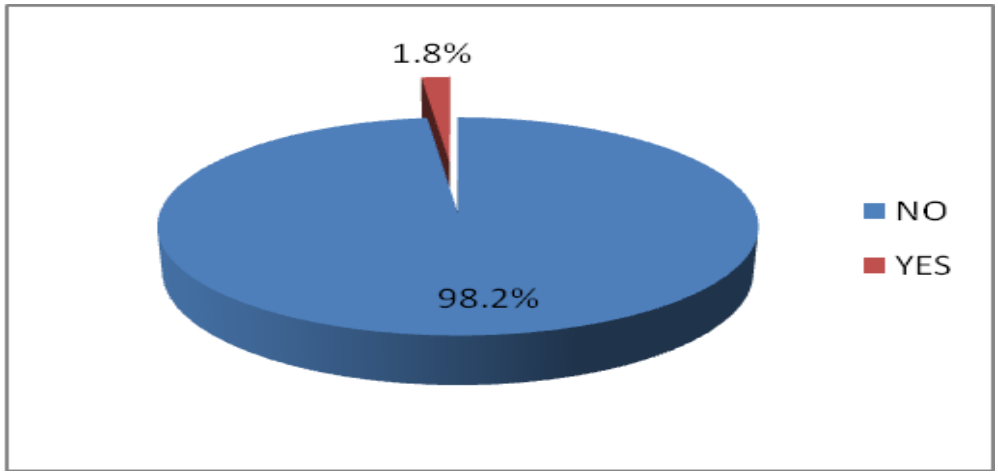


**FIGURE 30: STOMA FORMATION**

## 13. COMPLICATIONS LIKE WOUND SITE INFECTION, PORT SITE INFECTION

There were 4 cases where complications were experienced post operatively. In two of these cases there was need of conversion from laparoscopic to open surgery with subsequent wound site infection (50% of cases with conversion into open surgery).

Patients with multiple co-morbidities like type II diabetes mellitus, hypertension, previous history of pancreatitis and morbid obesity were the cases where port site infection was present in laparoscopic surgeries (3% of cases with laparoscopic surgery).

All of these patients were managed conservatively. No re-admission was required.

No wound related systemic complications like urinary tract infection, stroke, pneumonia, congestive heart failure, etc. were seen in any of the patients.

No patient required post ICU stay in our study.

**TABLE 20: POSTOP COMPLICATIONS**

| **COMPLICATIONS** | No. of cases | Percentage |
|---|---|---|
| NO | 51 | 92.7% |
| YES | 4 | 7.3% |

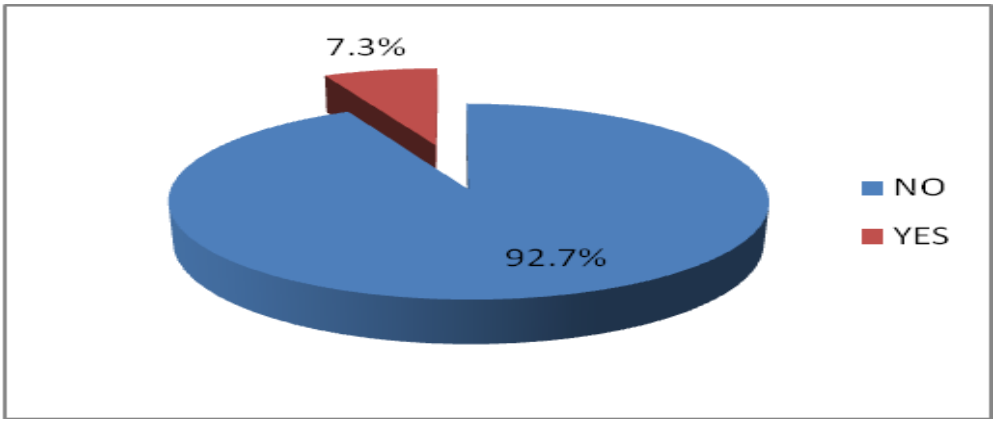


**FIGURE 31: POSTOP COMPLICATIONS**

## 14. DURATION OF STAY IN HOSPITAL

37 patients (67.3%) were discharged between 5-10days and 18 patients were discharged within 5 days of surgery. Post operative mean length was 5.35 days, ranging from 3-9 days. None of the patients required readmission to the hospital.

**TABLE 21 A: DURATION OF STAY IN HOSPITAL (in days)**

| **DURATION OF HOSPITAL STAY IN DAYS** | No. of cases | Percentage |
|---|---|---|
| < 5 | 18 | 32.7% |
| 5-10.0 | 37 | 67.3% |
| > 10 | 0 | 0.0% |
| Total | 2 | 3.6% |

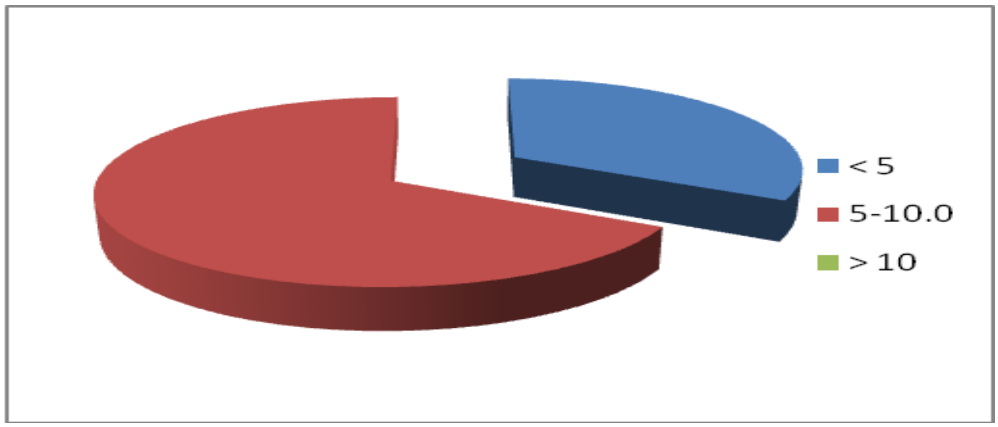


**FIGURE 32A: DURATION OF STAY IN HOSPITAL (IN DAYS)**

**TABLE 21B: MEAN DURATION OF STAY IN HOSPITAL (IN DAYS)**

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| DURATION OF HOSPITAL STAY IN DAYS | 55 | 3.00 | 9.00 | 5.35 | 1.47 |

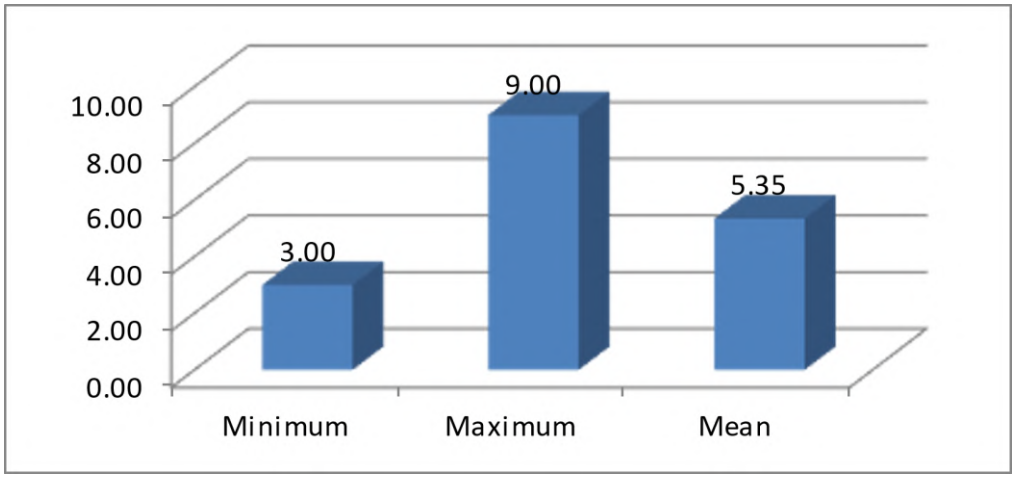


**FIGURE 32B: MEAN DURATION OF STAY IN HOSPITAL (IN DAYS)**

## 15. START ON SEMISOLID DIET

26 patients (47.3%) were started on semisolid diet on postoperative day 2 and21 patients (38.2) were started on semisolid diet on postoperative day 3. In only 15% of cases was semisolid diet started after post operative day 3.These cases can mainly be attributed to postop ileus resulting in difficulty accepting liquid diet.

**TABLE 22A: POSTOP DAY OF START OF SEMISOLID DIET (in days)**

| POST OP DAY WHEN PATIENT WAS STARTED ON SEMI SOLID DIET | No. of cases | Percentage |
|---|---|---|
| 2 | 26 | 47.3% |
| 3 | 21 | 38.2% |
| 4 | 6 | 10.9% |
| 5 | 2 | 3.6% |
| Total | 55 | 100.0% |

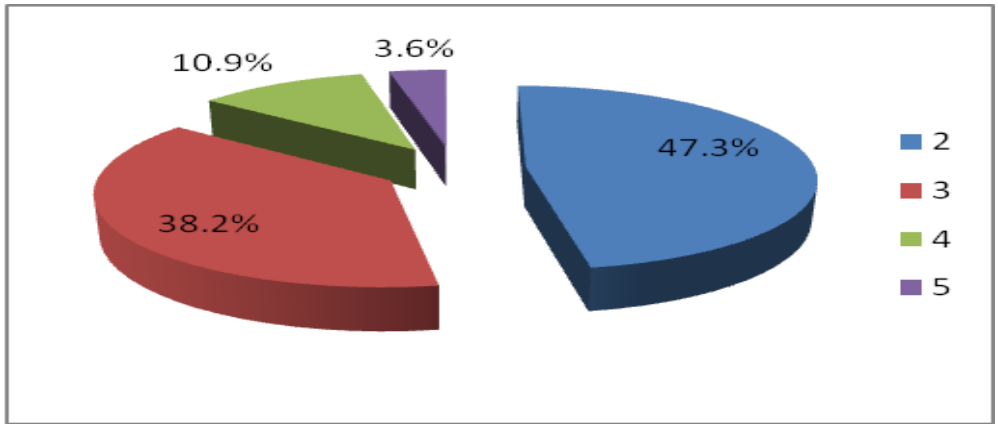


**FIGURE 33A: POSTOP DAY OF START OF SEMISOLID DIET (IN DAYS)**

**TABLE 22B: MEAN POSTOP DAY OF START OF SEMISOLID DIET (IN DAYS)**

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| POST OP DAY WHEN PATIENT WAS STARTED ON SEMI SOLID DIET | 55 | 2.00 | 5.00 | 2.71 | 0.81 |

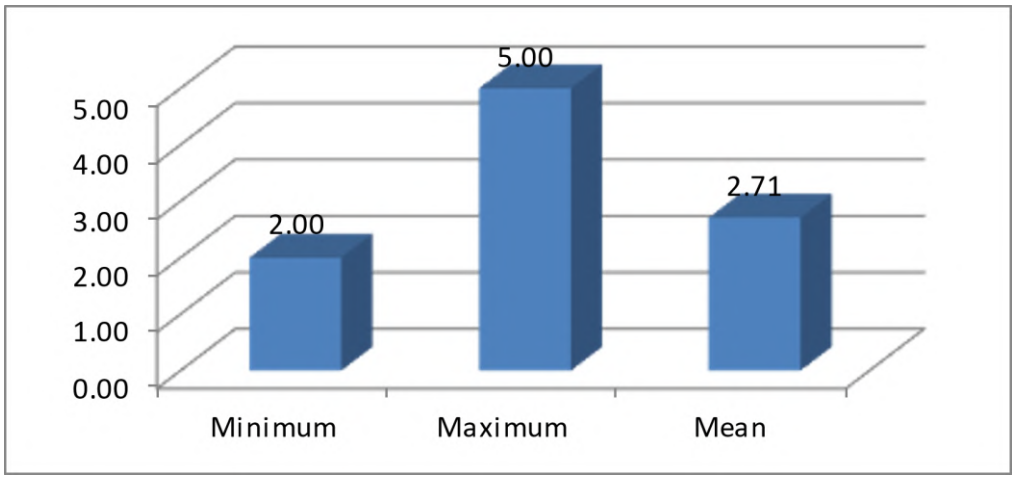


**FIGURE 33B: MEAN POSTOP DAY OF START OF SEMISOLID DIET (IN DAYS)**

**TABLE 23: KEY VALUES**

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| AGE | 55 | 17.00 | 89.00 | 40.00 | 17.74 |
| DURATION | 55 | 4.00 | 60.00 | 17.00 | 17.29 |
| SBP | 55 | 90.00 | 150.00 | 116.98 | 12.62 |
| DBP | 55 | 50.00 | 90.00 | 75.35 | 9.65 |
| HR | 55 | 76.00 | 132.00 | 100.15 | 13.29 |
| SPO2 | 55 | 92.00 | 99.00 | 96.09 | 2.12 |
| RR | 55 | 16.00 | 28.00 | 22.18 | 2.60 |
| HEMOGLOBIN | 55 | 9.10 | 15.40 | 12.16 | 1.70 |
| TLC | 55 | 6.30 | 19.80 | 13.77 | 2.75 |
| AST | 55 | 14.00 | 132.00 | 38.82 | 22.81 |
| ALT | 55 | 10.00 | 126.00 | 39.60 | 21.80 |
| S. CREATININE | 55 | 0.43 | 3.56 | 0.82 | 0.42 |
| S. SODIUM | 55 | 105.00 | 1369.00 | 158.33 | 166.35 |
| S. POTASSIUM | 55 | 3.50 | 37.00 | 4.83 | 4.50 |
| S. CHLORIDE | 55 | 95.00 | 139.00 | 101.11 | 7.92 |

The mean age of the patients was 40 years

The mean duration of the symptoms was 17 days

The mean SBP, DBP, HR, SPO2 and RR were 116.98, 75.35, 100.15, 96.09 and 22.18, respectively

The mean Hb and TLC were 12.16 and 13.77 respectively.

The mean AST, ALT were 38.82 and 39.60

The mean serum creatinine, sodium, potassium and chloride levels were 0.82, 158.33, 4.83 and 101.11 respectively

The mean operating time was 97.53 minutes

The mean stay in hospital was 5.35 days

The mean post-op day on which semi-solid diet was started was 2.71 days.

# DISCUSSION

In the present study, we assessed the clinical outcomes of laparoscopic appendectomy in patients with complicated appendicitis. We aim to elucidate whether this minimally invasive approach can be a feasible alternative to traditional open surgery in challenging cases.

**Demography**

**Age:**

In our study, the majority were in the age group of less than 30 years (38%), followed by 30-40 years, with mean age (in years) as 40±17.7.

Studies in India evaluated the feasibility of laparoscopic appendectomy in appendicular mass. **Shindholimath et al** [84]. in their retrospective study, 15% (N=120) of laparoscopic appendectomies were performed for appendicular mass aged 12 to 45 years. In the study conducted by **Utpal De et al** [9]. among 87 patients ,around half were between 20 and 40 years old.

**Ramesh et al**.[90] using a prospective study, evaluated laparoscopic appendectomy for early appendicular mass. Among 571 patients, 30 (5.2%) patients had appendicular mass. The majority belong to those aged 11-20, while the present study age is comparatively higher.**Surabhi et al**. [96] evaluated the predictors among complicated appendicitis, involving 87 patients with a mean age of 32.89 ± 13.93 years. **Lo CY et al** [81], during their retrospective study on 82 patients who underwent Lap appendectomy (Group A) with a median age of 34 years and 119 who underwent Open appendectomy (Group B) with a median age of 42.**Das et al**. [97] included patients in this retrospective study who were 21 to 30 years old. **Bhumika et al**. [98] compared the treatments of appendicular lump in 64 patients. The majority (35.9%) were from the age group 21 to 30 years. **Raj Kumar et al**.[99]analyzed the results of the early surgical examination and its drawback on conservative treatment following anappendectomy among those aged more than 12 years. **Haque et al**. [100] examined the result of early

appendectomy in appendicular mass patients. This prospective study had 60 patients, most aged 21 to 40 years. **Demetrashvili et al**. [101] compared the treatment for mass and abscess in the appendix. The average age was 41.9 years.

**Malik et al**., [102] using a prospective study, included 763 patients, of which 213 had mass with an average age of 28 years. **Gedam et al**. [103] researched acute appendicitis using a longitudinal study that included patients with an average age of 30.45 years; most patients (45.07%) were from the age group 20 to 30 years. **David Oliak et al**. [104] study included 77 patients with a mean age of 35 years.

**Sex**

Over half of the study patients were males in our study (58%). In **Shindholimath et al**. [84] study, males were double that of females. In **Ramesh et al** [90] Study, the majority of cases are male patients.**Surabhi et al** [96] Study had 66.7% males. In **Bhusan Das et al**. [97] In the study, 65.6% of the participants in group 1 and 62.5% in group 2 were males. In the study by **Bhumika et al**., [98] 65.63% of males were from both groups. In **Raj Kumar et al**. [99] Study males were 67.39%. In the **Haque et al**. [100] study, 66.67% were males. In **Vikesh et al**. [105] Analysis 62.5% were males. In **Malik et al**. [102] study, 53.9% were males. In the **Manoj Kumar et al.** [91] study**,** the majority (66.6%) were males. **Gedam et al**.**'s** [103] study had over 50% females. In the study by **David Oliak et al**., 64% were males. A majority of studies documented male predominance, similar to our study.

**Duration of symptom:**

In our study, 36% presented with acute abdomen and remaining with subacute pain, while similar studies had all patients with acute abdomen. The higher percentage in other studies is due to subacute inclusion in the acute combined category.

Other symptoms:

In our present study, 35% of cases had fever, vomiting in 20% of cases, 14.5% had loose stools and nausea was present in 9.1% of cases.

**Utpal De et al**[9]. Analysed that 55.2% had right iliac fossa pain, vomiting, and palpable lump in RIF, and 44.8% had features of septic peritonitis. In RIF lump patients, 11.5% had a history of acute appendicitis.In **Raj Kumar et al**. [99] Study, 82.9% had nausea/ vomiting and pain, 78.8% reduced oral intake, and 71% had afever. In **Demetrashvili et al**. [101] Analysis patients had nausea and vomiting, mass. **Malik et al**. [102] analyzed patients with right lower abdomen pain, anorexia, nausea /vomiting, and fever. In **Gedam et al**. [103] Study patients had right-side lower quadrant acute pain, nausea/ vomiting, fever, anorexia, and leukocytosis.

Around 2/3$^{rd}$ of the patients in our study had symptoms that lasted less than 15 days. Around 10% had symptoms over one month. The mean duration of symptoms was 17±17 days. In the **Utpal De et al**. [9] Study, the period of disease was 3 to 9 days (mean 5.8). In **the Bhusan Das et al**. [97] **study, the** majority of patients were admitted after 4th day of pain. In the study by **Bhumika et al**. [98] on admission, 35.9% of patients had 4$^{th}$ day of onset of RIF pain. In **Demetrashvili et al**.[101] study, the period of discomfort was 6 – 8 days. In **Gedam et al**. [103] Study patients had identified within 2 days of abdominal pain. **David Oliak et al**. [104] study had patients with pain for 6 days.

Compared to other studies, our study had a comparatively higher duration of illness, probably because of the inclusion of a subacute abdomen in addition to the acute abdomen.

Co-morbidities:

Around 20% had **comorbidity** in our study. The majority of them had hypertension (7%), followed by DM. In **Demetrashvili et al**. [101] Study patients with DM in group 1 was 4% and in group 2 was 13%.

Previous history of surgery:

Around 40% had a past history of surgeries, with the majority having haemorrhoidectomy and fistulectomy. Around 5% had cholecystectomy. In the **Lo CY et al**. [81] study, 3% had previous lower abdominal operation.

Tenderness was present in all of the cases (100%). Rebound tenderness was present in 60% of the study patients. In **Raj Kumar et al.** [99] study, 26 had rebound tenderness, 28 had tender mass, and 8 had both. In **Malik et al**. [102] study The Right iliac region was tender in 84.5% of the patients. In **Gedam et al**. [103] Study rebound tenderness was present in 59.15% of patients, and RIF tenderness was present in 100%.

Thus majority of the patients presented with tenderness and rebound tenderness.

**USG abdomen:**

In USG, Periappendicular collection was observed in all the patients, Caecal/Appendicular Gangrene at 16%, Pelvic collection at 54%, and Intestinal Obstruction at 2%.

Intraoperative findings in our study suggested that retrocaecal location was found in 67% of the cases; followed by pelvic (26%), sub caecal (6%), and para caecal (2%).

Around 2/3$^{rd}$ of the patients had ruptured at the tip of the appendix, in 20% of cases site of rupture was the base and rupture from the middle

was seen in 12% of cases. Over 95% had adherence to omentum. Caecal involvement is found in 63%, ileum in 44%, and colon in 6%.

In about 1/4$^{th}$ of cases there was difficulty in adhesiolysis and difficulty in localising appendix intra-operatively. In 16% of our cases, caecal gangrene was present intra-operatively.

In the study by **Manoj Kumar et al**., [91] the tip was affected in 25% of patients.In **Lo CY et al**.[81] study hadinflamed omentum in 1 case.In **Ramesh et al**. [90] study, in of one of the case difficulty in adhesiolysis was experienced and the nearby ileum experienced a serosal tear, which was fixed through laparoscopic surgery with endo sutures.

In **David Oliak et al**. [104] study, complications included ileus. In **Shindholimath et al** [84] study in one of the cases appendicular perforation with an unhealthy appendicular base and caecal gangrene was found intra-operatively, for which they did a hemicolectomy. During the intra-operation of **Manoj Kumar et al**. [91] Study gangrenous appendix was found in 16.6% of patients. In a **study by Abdul Razaque Shaikh** [92], postoperative outcomes of early appendectomy for patients with appendicular mass using laparoscopic surgery revealed that appendicular abscess was found in 12 cases (16.43%), and perforated appendix in 10 cases (13.69%). Additionally, adhesions were encountered in 15 cases (20.5%), and difficulty in localizing the appendix in 6 cases (8.21%).

Operating time in our study was <90 mins in 44%, 40% in 90-120mins, 9% in 120-150mins and 7% with over 150mins (mean: 97±24mins). There is 7% need for laparascopic to open conversion. In **Ramesh et al** [90]. analysis: 1 case was converted to open surgery, as the extensive adhesions. In **David Oliak et al**. analysis, 22% patients converted to open surgery. In **Shindholimath et al** [84] study the mean operative time was 95 minutes. In **Utpal De et al** [9]. Analysis the average time was 65 minutes. In **Ahmed et al** [95]. Study the mean time was shorter for OA of 91.4 minutes compared to 109.1 minutes of LA.

**Ramesh et al** [90]. Study had average of 60.66 minutes (range - 40 to 90 mins). In **Surabhi et al** [96]. Analysis the mean operating time was 87.93 ± 30.68 minutes.**Lo CY, et al**.[81] had a median period of 80 minutes (range - 40 to 195) in Group A and 60 minutes (range - 25 to 260) in Group B. In **Kumar et al**. [99] The study, 56.5% in group 1 had an operative time of 60-90 mins. Meanwhile, 65% of group 2 had 90-120 mins. In **Vikesh et al**. [105] Analysis the mean was 72 minutes (45 – 93 minutes). In **Manoj kumar et al**. [91] Study the mean time was 90 minutes. **David Oliak et al**. The study had an average operative time of 88 minutes.

The operative time is similar to our study and need of conversion from laparoscopic to open surgery was seen only in 7% of cases favoring good outcome of laparoscopic appendectomy in cases with appendicular lump.

In our study, the duration of stay was <5 days in 33%, and 67% stayed for 5-10 days (average: 5.3±1.4 days). Over 70% started a semisolid diet by the 3rd day of the postoperative period (mean: 2.7±0.8 days).

In **Shindholimath et al** [84] analysis patients stayed for an average of 6 days (6 – 9 days). **Utpal De et al** [9]. Study patients stayed for 9 days (7 to 21 days). In **Ahmed et al** [95]. Study the average stay of LA and OA was 4.75 and 7.05 days respectively. In **Ramesh et al** [90]. Evaluation majority (76.7%) of patients went home after 3 days. **Surabhi et al** [96]. Study had average hospital stay of 6.7 days. In **Lo CY et al** [81]. Analysis the median hospital stay for patients in Group A was 3 days and in Group B was 4 days.**Das et al**. [97] Analyzed that majority (75%) of patients in group 1 went home after 7 days, in contrast with group 2, where majority (58.3%) of patients went home within 3 days. In **Bhumika et al**. [98] Analysis, the mean duration in group 1 was 11 days and in group 2 was 4 days. In **Raj kumar et al**. [99] Study, majority (69.5%) in group 1 stayed for 8 to 14 days and in group 2, 47.82% stayed for 15 to 21 days. In **Haque et al**. [100] Study, 90% stayed in hospital for 4 days and in group 2, 55.56% stayed for 12

days. In **Vikesh et al**. [105] Analysis the mean stay was 3 days (1 – 6 days). In **Demetrashvili et al**. [101] Study the average stay in group 1 was 8 days and in group 2 was 6 days. In **Manoj kumar et al**. Study, patients went to home after 5 days of stay. In **David Oliak et al**. [104] Analysis, the mean stay was 8 days (3 to 24 days). **Abdul Razaque Shaikh** [92], showed the mean hospital stay was 4.91 days ± 1.65 (range: 3-9 days). **Bilal Tarar** [87] study showed that The mean length of hospital stay was significantly shorter in patients undergoing early appendectomy compared to those managed conservatively (1.83 ± 0.83 days vs. 2.80 ± 1.54 days)

Thus concluding that the average stay in the hospital in our study was comparable to other studies conducted before with an early intake of semisolid food.

In our study 4 cases (7%) had the need of conversion of laparoscopic to open surgery. Mainly these patients had multiple co-morbidities like type II diabetes mellitus, hypertension and morbid obesity.

**Shindholimath et al.** [84] Exam the postoperative complications were observed in 15.7% patients, including wound infections and mass beneath the umbilical port. In **Utpal De et al** [9] Study minor wound infections present in 15 patients. In **Ramesh et al** [90] Analysis, 6.66% had port site infection.**Surabhi et al.**[96]Study had infection in drain site, enterocutaneous fistula and abscess in intra-abdomen. In **McAnena et al** [74] Analysis, average of 11% had wound infection in open and 4% in laparoscopic Appedicectomy.**Lo CY et al** [81] Study had complication rate of 13.4% in Groups A and 15.8% in Group B.In **Raj kumar et al.**[99] Study, sepsis in wound, partial wound dehiscence, intestinal obstruction, abscess and chest complications were present. In**Haque et al**. [100] Study, group 2 had wound infection, paralytic ileus and fecal fistula. In **Vikesh et al.** Analysis minor wound infection and pelvic abscess were seen. **Manoj kumar et al**. [91] Analysis showed infection of the surgical site in 16.6% of patients. In **David Oliak et al**.[104] study, patients had wound and Ileus SBO in 6.5% of cases and other

complications below 2%. In a similar study conducted by **Bahram, M. A**.[83] among46 patients with immediate appendicectomy for appendicular mass. Peri-appendiceal abscesses were found in 25%.

Difficulty with adhesolysis and localization of the appendix occurred in 10% (4 patients). Superficial wound infections occurred in 17% (8 patients), while deep wound infections were seen in 9% (4 patients). The average hospital stay was 3 ± 0.25 days. **Abdul Razaque Shaikh** [92], showed wound infection in 15 cases (20.5%). **Bilal Tarar** [87] determined that there was no significant difference in the frequency of perforation between the conservative management group and the early appendectomy group. **Gaik S**. et al. [89] compared laparoscopic appendectomy (LA) to open appendectomy (OA) for complicated appendicitis, involving 6,428 patients which showed that the rate of intra-abdominal abscess showed no significant difference between LA and OA (6.1% vs. 4.6%). However, LA was associated with decreased overall post-operative morbidity (15.5% vs. 22.7%), reduced rates of wound infection, respiratory complications, and post-operative ileus/small bowel obstruction.

As compared to studies conducted before, the complications with laparoscopic appendectomy for appendicular mass were less (7.3% of cases) in our study mainly with need for conversion into open surgery and in patients with co-morbidities.

A review of Meshikhes [82] et al. suggested that the Laparoscopic appendicectomy, whether performed in an emergency or interval setting, is both feasible and safe, and is advocated to replace the conventional open method. Large prospective, randomized controlled trials are lacking, and therefore, such trials are needed to scientifically compare emergency surgery vs conservative management without interval appendectomy.

## LIMITATIONS

- The present study was conducted in a single setting, hence the generalizability of findings to other setting is limited
- The long-term outcomes of surgery were not documented.
- The present study is observational in nature, hence the causality attributed for the clinical outcomes could not be established

# SUMMARY AND CONCLUSION

The present study evaluated the outcome following laparoscopic appendectomy done for 55 patients of complicated appendicitis operated in the department of General Surgery in Dayanand medical college and hospital, Ludhiana over a period of two yearbetween October 2022 to October 2024.

Routine investigations were done on these patients. Ultrasound and CECT abdomen were performed and findings noted where applicable. Over the course of study we concluded that laparoscopic management is viable, and indeed beneficial for the treatment of complicated appendicitis when performed with latest surgical techniques and instruments by experienced surgeons. It was associated with a shorter hospital stay, fewer complications and early return to the enteral fields.

The mean age of the patients studied was 40 years with 58.2% being males. It was noted that the in patients presenting with abdominal mass there was a longer duration of symptoms with mean duration of pain abdomen being 17 days. Mild to moderate right iliac fossa tenderness was present in all of our cases with rebound tenderness being present in 60% of cases. Intraoperatively retrocaecal (67.3%) followed by pelvic (25.5%) was the most location of appendix. Omentum (98.2%) was found to be the first and most common structure to get adhered to appendix when inflammation occurs followed by caecam (63.6%) and distal ileum (43.6%). Appendicular base gangrene was found to be present in 16.4% of our patients and was found to be the main culprit leading to complication. Difficulty in adhesiolysis was present in 34.5% of cases while it was found in 9 out of 9 cases of appendicular base gangrene. Difficulty in localization of appendix was found in 23.6% of cases and in 9 out of 9 cases with cecal gangrene.

Mean operative time was 97mins for laparoscopic appendectomy with operating being less than 90mins in 43.6% of cases. Duration of

hospital stay was less than 5 days in 32% of our patients with the mean duration of hospital coming out to be 5.35 days. This also takes into account the one day that the patient is admitted comes pre-operatively for pre-anesthetic check up and optimization. 47.3% of the patients were consuming in semi-solid diet at postop day 2 while 38.2% patients started on post op day 3 after surgery. Laparoscopic to open conversion was required in 7.3% of cases with stoma being formed in a single case. Four of our cases also had postop wound infection, but two of the four occurring in the cases where in open conversion was required.

Under the current treatment regimens, patients managed conservatively for appendicular mass have to endure greater morbidity and repeated hospitalization compared to patients undergoing laparoscopic appendectomy at the first time of presentation.

The study concluded that early surgical intervention laparoscopically in patients with appendicular mass is feasible, without increased risk of mortality or morbidity. The outcomes indicated benefits such as single hospitalization and shorter hospital stays. These findings strongly support that laparoscopic appendectomy should be preferred over open surgery for patients with complicated appendicitis. The study also emphasizes that laparoscopy requires minimal conversion to open surgery, reinforcing the laparoscopic approach as the optimal treatment modality.

# BIBLIOGRAPHY


1. Joy S, Devani R, Shinde N. Comparative evaluation of conservative management versus early surgical intervention in appendicular mass – a retrospective study. RGUHS J Med Sci. 2022;12.
2. Vaos G, Dimopoulou A, Gkioka E, Zavras N. Immediate surgery or conservative treatment for complicated acute appendicitis in children? A meta-analysis. J Pediatr Surg. 2019;54:1365-71.
3. Gignoux B, Blanchet MC, Lanz T, Vulliez A, Saffarini M, Bothorel H, et al. Should ambulatory appendectomy become the standard treatment for acute appendicitis? World J Emerg Surg. 2018 Jun 28;13.
4. Eng KA, Abadeh A, Ligocki C, Lee YK, Moineddin R, Adams-Webber T, et al. Acute appendicitis: a meta-analysis of the diagnostic accuracy of US, CT, and MRI as second-line imaging tests after an initial US. Radiology. 2018;288:717-27.
5. Kartal İ. Childhood neuroendocrine tumors of the digestive system: a single center experience. Medicine (Baltimore). 2022;101:e28795.
6. Khan MS, Chaudhry MBH, Shahzad N, Tariq M, Memon WA, Alvi AR. Risk of appendicitis in patients with incidentally discovered appendicoliths. J Surg Res. 2018;221:84-87.
7. Stringer MD. Acute appendicitis. J Paediatr Child Health. 2017 ;53:1071-76.
8. Senapathi PSP, Bhattacharya D, Ammori BJ. Early laparoscopic appendectomy for appendicular mass. Surg Endosc. 2002 ;16:1783-85.
9. De U, Ghosh S. Acute appendicectomy for appendicular mass: a study of 87 patients. Ceylon Med J. 2002;47:117-18.
10. Jordan JS, Kovalcik PJ, Schwab CW. Appendicitis with a palpable mass. Ann Surg. 1981;193:227-29.
11. Foran B, Berne TV, Rosoff L. Management of the appendiceal mass. Arch Surg. 1978;113:1144-45.

12.Janik JS, Ein SH, Shandling B, Simpson JS, Stephens CA. Nonsurgical management of appendiceal mass in late presenting children. J Pediatr Surg. 1980;15:574-76.
13.Bagi P, Dueholm S. Nonoperative management of the ultrasonically evaluated appendiceal mass. Surgery. 1987;101:602-05.
14.Oliak D, Yamini D, Udani VM, Lewis RJ, Vargas H, Arnell T, et al. Nonoperative management of perforated appendicitis without periappendiceal mass. Am J Surg. 2000;179:177-181.
15.Garg P, Dass B, Bansal A, Chitkara N. Comparative evaluation of conservative management versus early surgical intervention in appendicular mass--a clinical study. J Indian Med Assoc. 1997.
16.Gilchrist BF, Lobe TE, Schropp KP, Kay GA, Douglas Hixson S, Wrenn EL, et al. Is there a role for laparoscopic appendectomy in pediatric surgery? J Pediatr Surg. 1992;27:209-14.
17.Pearl RH, Hale DA, Molloy M, Schutt DC, Jaques DP. Pediatric appendectomy. J Pediatr Surg. 1995;30:173-81.
18.Semm K. Endoscopic appendectomy. Endoscopy. 1983;15:59-64.
19.Attwood SEA, Mealy K, Hill ADK, Stephens RB. A prospective comparison of laparoscopic versus open cholecystectomy. Ann R Coll Surg Engl. 1992;74:397.
20.Kum CK, Ngoi SS, Goh PMY, Tekant Y, Isaac JR. Randomized controlled trial comparing laparoscopic and open appendicectomy. Br J Surg. 1993;80:1599-1600.
21 Ravichandran K, Jayaraman R, Nithya K. A Prospective Study On Appendicular Mass. International Surgery Journal. 2021 26;8:1114.
22.Al-Obaidi JH. Early Appendectomy In Appendicular Mass. Bionatura. 2022;7.
23.Koirala A, Thakur D, Agrawal S, Pathak KR, Bhattarai M, Sharma A. Appendicular Mass: A Conservative Approach. Journal Of Nobel Medical College. 2016;5:47–50.
24. Rafi J, Umranikar S. Appendicular Mass Mimicking As Suprapubic Mass: A Case Report. Cases J [Internet]. 2009;2:7815.
25.Souza ND', Nugent K. Appendicitis. Am Fam Physician 2016;93:142–3

26. Hardin DM. Acute Appendicitis: Review and Update. Am Fam Physician. 1999 Nov 1;60(7):2027–34.
27. Addiss DG, Shaffer N, Fowler BS, Tauxe R V. The Epidemiology Of Appendicitis And Appendectomy In The United States. Am J Epidemiol. 1990;132:910–25.
28. Sulu B, Gunerhan Y, Palanci Y, Işler B, Caglayan K. Epidemiological And Demographic Features Of Appendicitis And Influences Of Several Environmental Factors. Turkish Journal Of Trauma And Emergency Surgery. 2010;16:38–42.
29. Guan L, Liu Z, Pan G, Zhang B, Wu Y, Gan T, Et Al. The Global, Regional, And National Burden Of Appendicitis In 204 Countries And Territories, 1990-2019: A Systematic Analysis From The Global Burden Of Disease Study 2019. BMC Gastroenterol 2023;23.
30. Global Health Estimates. Available from: https://www.who.int/data/global-health-estimates
31. Golz RA, Flum DR, Sanchez SE, Liu XH, Donovan C, Drake FT. Geographic association between incidence of acute appendicitis and socioeconomic status. JAMA Surg. 2020;155:330–8.
32. Stewart B, Khanduri P, Mccord C, Ohene-Yeboah M, Uranues S, Vega Rivera F, Et Al. Global Disease Burden Of Conditions Requiring Emergency Surgery. British Journal Of Surgery [Internet]. 2014 ;101.
33. Bhangu A, Søreide K, Di Saverio S, Assarsson JH, Drake FT. Acute Appendicitis: Modern Understanding Of Pathogenesis, Diagnosis, And Management. The Lancet. 2015;386:1278–87.
34. Karabulut KU, Erinanc H, Yonar A, Kisinma A, Ucar Y. Correlation Of Histological Diagnosis And Laboratory Findings In Distinguishing Acute Appendicitis And Lymphoid Hyperplasia. Ann Surg Treat Res. 2022;103:306–11.
35. Narula N, Gibbs KE, Kong F, Mukherjee I. Appendiceal Intussusception, Diverticula, And Fecalith Associated With Appendicitis. American Surgeon. 2023;89:6257–9.
36. Levin MD. Pathogenesis Of Acute Appendicitis: Review. Gastroenterology & Hepatology: Open Access. 2019;10:279–85.

37. Blohs M, Mahnert A, Brunnader K, Flucher C, Castellani C, Till H, Et Al. Acute Appendicitis Manifests As Two Microbiome State Types With Oral Pathogens Influencing Severity. Gut Microbes. 2023;15.
38. Febyan. Acute Appendicitis In Adults: Current Concept Of Diagnosis And Management. 2020;
39. Petroianu A, Barroso T. Pathophysiology Of Acute Appendicitis. 2016;
40. Barman A, Panja M, Samanta R, Ranajit Bari. Various Unusual Presentation Of Acute Appendicitis In Adult. A Case Series. Asian J Med Sci. 2023 Apr 1;14(4):264–7.
41. Afridi MA, Khan I, Khalid MM, Ullah N. Combined Clinical Accuracy Of Inflammatory Markers And Ultrasound For The Diagnosis Of Acute Appendicitis. Ultrasound. 2023;31:266–72.
42. Styazhkina SN, Kiryanov NA, Abramovich AA, Valinurov AA, Zaitsev DV, Andrianov AI, et al. Features of diagnosis and course of acute appendicitis during the COVID-19 pandemic. Eksperimental'nayaiKlinicheskayaGastroenterologiya/Experimental and Clinical Gastroenterology. 2022;200:179–83.
43. Snyder MJ, Guthrie M, Cagle SD. Acute Appendicitis: Efficient Diagnosis And Management. Am Fam Physician. 2018.
44. Van Aerts RMM, Van De Laarschot LFM, Banales JM, Drenth JPH. Clinical Management Of Polycystic Liver Disease. J Hepatol. 2018 ;68:827–37.
45. Iwamoto Y, Onishi T, Suzuki R, Arima K, Sugimura Y. Uretero-Appendiceal Fistula. International Journal Of Urology. 2008;15:180–1.
46. Yang HR, Wang YC, Chung PK, Chen WK, Jeng L Bin, Chen RJ. Laboratory Tests In Patients With Acute Appendicitis. ANZ J Surg. 2006;76:71–4.
47. Withers AS, Grieve A, Loveland JA. Correlation Of White Cell Count And CRP In Acute Appendicitis In Paediatric Patients. South African Journal Of Surgery. 2019;57:9–13.

48. Rao PM. Cecal apical changes with appendicitis: diagnosing appendicitis when the appendix is borderline abnormal or not seen. J Comput Assist Tomogr 2024;23:55–9
49. Pooler BD, Repplinger MD, Reeder SB, Pickhardt PJ. MRI Of The Nontraumatic Acute Abdomen: Description Of Findings And Multimodality Correlation. Gastroenterol Clin North Am. 2018;47:667–90.
50. Swenson DW, Ayyala RS, Sams C, Lee EY. Practical imaging strategies for acute appendicitis in children. American journal of roentgenology. 2018;211:901-9.
51. Sharma M, Agrawal A. Pictorial Essay: CT Scan Of Appendicitis And Its Mimics Causing Right Lower Quadrant Pain. Indian Journal Of Radiology And Imaging. 2008;18:80–9.
52. Hwang ME. Sonography And Computed Tomography In Diagnosing Acute Appendicitis. Radiol Technol. 2018;
53. Kave M, Parooie F, Salarzaei M. Pregnancy And Appendicitis: A Systematic Review And Meta-Analysis On The Clinical Use Of MRI In Diagnosis Of Appendicitis In Pregnant Women. World Journal Of Emergency Surgery. 2019;14.
54. Awayshih MM Al, Nofal MN, Yousef AJ. Evaluation Of Alvarado Score In Diagnosing Acute Appendicitis. Pan African Medical Journal. 2019;34.
55. Dr. Alla Mounica, Dr. S. Krishna Reddy, Dr. Kanna Chandra Varma, Dr. Rapaka Ashok Reddy. A Clinical Study Of Appendicular Perforation. Int J Sci Res Sci Technol. 2023;13–7.
56. Das A, Pandurangappa V, Tanwar S, Mohan SK, Naik H. Fishbone-Induced Appendicular Perforation: A Rare Case Report Of Amyand's Hernia. Cureus. 2023.
57. Gharde P, Waghmare LS, Gode DS, Muntode P, Rohariya H, Sharma A. Gangrenous, Perforated Meckel's Diverticulum Mimicking Appendicular Lump: A Case Report. Glob J Surg [Internet]. 2014;2:19–20.

58. Yariyama H, Nitta M, Matsushita K. Perforation Of The Appendix Due To A Denture-Report Of A Case-. Nihon Rinshogeka Gakkai Zasshi (Journal Of Japan Surgical Association). 2000;61:1242–5.
59. Pandey C, Kesharwani R, Chauhan C, Pandey M, Mittra P, Kumar P, Et Al. Management Of Appendicular Lump: Early Exploration Vs Conservative Management. Int J Med Sci Public Health. 2013;2:1046.
60. Hansson J, Körner U, Khorram-Manesh A, Solberg A, Lundholm K. Randomized Clinical Trial Of Antibiotic Therapy Versus Appendicectomy As Primary Treatment Of Acute Appendicitis In Unselected Patients. British Journal Of Surgery. 2009;96:473–81.
61. Styrud J, Eriksson S, Nilsson I, Ahlberg G, Haapaniemi S, Neovius G, Et Al. Appendectomy Versus Antibiotic Treatment In Acute Appendicitis. A Prospective Multicenter Randomized Controlled Trial. World J Surg. 2006;30:1033–7.
62. A Randomized Trial Comparing Antibiotics With Appendectomy For Appendicitis. New England Journal Of Medicine. 2020 ;383:1907–19.
63. Vons C, Barry C, Maitre S, Pautrat K, Leconte M, Costaglioli B, Et Al. Amoxicillin Plus Clavulanic Acid Versus Appendicectomy For Treatment Of Acute Uncomplicated Appendicitis: An Open-Label, Non-Inferiority, Randomised Controlled Trial. The Lancet. 2011;377:1573–9.
64. Harnoss JC, Zelienka I, Probst P, Grummich K, Müller-Lantzsch C, Harnoss JM, Et Al. Antibiotics Versus Surgical Therapy For Uncomplicated Appendicitis: Systematic Review And Meta-Analysis Of Controlled Trials (PROSPERO 2015:CRD42015016882). Ann Surg. 2017;265:889–900.
65. Orford C, Clarke M, London. United States Patent Fryszman. Dosage regimen for the treatment of acute exacerbations of inflammatory conditions. Applicant: Mereo Biopharma 1 Limited, London (GB). Foreign Patent Documents. 2005.
66. Dreznik Y, Feigin E, Samuk I, Kravarusic D, Baazov A, Levy I, Et Al. Dual Versus Triple Antibiotics Regimen In Children With Perforated

Acute Appendicitis. European Journal Of Pediatric Surgery. 2018 ;28:491–4.

67. Kumar S, Jalan A, Patowary BN, Shrestha S. Laparoscopic Appendectomy Versus Open Appendectomy For Acute Appendicitis: A Prospective Comparative Study. Kathmandu University Medical Journal. 2016;14:244–8.
68. R TC, Fuad AY. Laparoscopic Appendicectomy For Complicated Appendicitis In Children.
69. Siribumrungwong B, Chantip A, Noorit P, Wilasrusmee C, Ungpinitpong W, Chotiya P, Et Al. Comparison Of Superficial Surgical Site Infection Between Delayed Primary Versus Primary Wound Closure In Complicated Appendicitis. Ann Surg. 2018;267:631–7.
70. Turk E, Acimis NM, Karaca F, Edirne Y, Tan A, Kilic C. The effect on postoperative pain of pulling the rectus muscle medially during open appendectomy surgery. Minerva Chir. 2014;69:141-6.
71. Calis H. Morbidity And Mortality In Appendicitis In The Elderly. Journal Of The College Of Physicians And Surgeons Pakistan. 2018 ;28:875–8.
72. Keller CA, Dudley RM, Huycke EM, Chow RB, Ali A. Stump Appendicitis. Radiol Case Rep [Internet]. 2022;17:2534–6
73. Attwood SEA, Mealy K, Hill ADK, Stephens RB. A Prospective Comparison Of Laparoscopic Versus Open Cholecystectomy. Ann R Coll Surg Engl [Internet]. 1992;74:397.
74. Mcanena OJ, Austin O, O'Connell PR, Hederman WP, Gorey TF, Fitzpatrick J. Laparoscopic versus open appendicectomy: a prospective evaluation. Br J Surg [Internet]. 1992;79:818–20.
75. Vallina VL, Velasco JM, Mcculloch CS. Laparoscopic Versus Conventional Appendectomy. Ann Surg. 1993;218:685–92.
76. Heikkinen TJ, Haukipuro K, Hulkko A. Cost-Effective Appendectomy: Open Or Laparoscopic? A Prospective Randomized Study. Surg Endosc. 1998;12:1204–8.
77. Guller U, Hervey S, Purves H, Muhlbaier LH, Peterson ED, Eubanks S, Et Al. Laparoscopic Versus Open Appendectomy: Outcomes

Comparison Based On A Large Administrative Database. Ann Surg [Internet]. 2004;239:43–52.

78. Prabhu P. A Comparative Study Of Laparoscopic Appendectomy Versus Open Appendectomy In Terms Of Postoperative Pain, Post Operativecomplications, Duration Of The Hospital Stay, Return To The Work, Cosmetic Benefit, Duration Of Time Of The Surgery In Our Institution. 2016.
79. Utpal D. Laparoscopic Versus Open Appendectomy In West Bengal, India. Chin J Dig Dis. 2005;6:165–9.
80. Laine S, Rantala A, Gullichsen R, Ovaska J. Laparoscopic Appendectomy - Is It Worthwhile? A Prospective, Randomized Study In Young Women. Surg Endosc. 1997;11:95–7.
81. Yong JL, Law WL, Lo CY, Lam CM. A Comparative Study Of Routine Laparoscopic Versus Open Appendectomy. JSLS [Internet]. 2006;10:188–92.
82. Meshikhes AW. Management Of Appendiceal Mass: Controversial Issues Revisited. J Gastrointest Surg. 2008;12:767–75.
83. Bahram MA. Evaluation Of Early Surgical Management Of Complicated Appendicitis By Appendicular Mass. International Journal Of Surgery. 2011;9:101–3.
84. Shindholimath V, Thinakaran K, Rao T, Veerappa Y. Laparoscopic Management Of Appendicular Mass. J Minim Access Surg. 2011;7:136–40.
85. Hori T, Machimoto T, Kadokawa Y, Hata T, Ito T, Kato S, Et Al. Laparoscopic Appendectomy For Acute Appendicitis: How To Discourage Surgeons Using Inadequate Therapy. World J Gastroenterol. 2017;23:5849–59.
86. Khan MMH, Sultana J, Ahsan T, Ahsan SA. Laparoscopic Management Of Perforated Appendicitis-A Study Of 90 Cases. Journal Of Surgical Sciences. 2020;23:59–66.
87. Tarar B, Batool S, Majeed S, Saleem A. Comparison Between Early Appendectomy vs. Conservative Management in Cases of Appendicular Mass. Cureus. 2023.

88. Abbas M, Noor M, Khan MF. Advantages of Laparoscopic Appendectomy in young females. PAKISTAN JOURNAL OF MEDICAL & HEALTH SCIENCES. 2018;12:449-50.
89. Quah GS. Laparoscopic Appendicectomy Is Superior To Open Surgery For Complicated Appendicitis - Pubmed [Internet]. 2019.
90. Ramesh K, Janapareddy KK. Role Of Laparoscopic Appendicectomy In Management Of Early Appendicular Mass. International Surgery Journal. 2020;7:2337.
91. Chaudhary MK, Shankar M, Baruah TD, Ray R, Samal S. Laparoscopic Management Of Appendicular Lump. International Surgery Journal. 2020;7:3065.
92. Shaikh AR, Shaikh AA, Gull S. Postoperative outcome of early appendectomy in patients having appendicular mass by laparoscopic surgery. Annals of PIMS-Shaheed Zulfiqar Ali Bhutto Medical University. 2020;16:166-9.
93. Abdulraheem OA, Amer IA. Laparoscopic versus conservative treatment of appendicular mass: outcome and benefit comparisons. The Egyptian Journal of Surgery. 2022;40.
94. Borkar N, Sharma C, Mohanty D, Singha SK. A Systematic Review And Meta-Analysis Of Harmonic Scalpel Versus Conventional Techniques Of Appendiceal Stump Closure In Laparoscopic Appendicectomy. Cureus. 2022.
95. Sabry AA, Menesy M, Kassem M, Elkeleny MR. The Outcomes Of Laparoscopic Versus Open Appendectomies For Complicated Appendicitis. The Egyptian Journal Of Surgery. 2023;42:736–44.
96. Surabhi A, Behura A, Behera CR, Patra RK, Panda B, Mishra A, et al. Post-Operative Outcomes of Laparoscopic Appendectomy in Acute Complicated Appendicitis: A Single Center Study. Cureus. 2023;15.
97. Das BB, Nayak KN, Mohanty SK, Sahoo AK. A retrospective analysis of conservative management versus early surgical intervention in appendicular lump. Cureus. 2022;14.
98. Patel BJ, Patel KH. A Comparative Study Of Appendicular Lump Management. International Surgery Journal [Internet]. 2015;2:235–8.

99. Kumar R, Madeshiya S, Pandey VK, Shankhdhar A. Comparative Analysis Of Early Exploration Versus Conservative Approach For Management Of Appendiceal Mass. International Surgery Journal [Internet]. 2018;5:3868–72.
100. Haque ASMR, Saha BK, Haque MM, Sattar MA, Ray UN, Rahman MA, Et Al. Evaluation Of Outcome Of Early Appendectomy In Appendicular Lump. Int J Contemp Pediatrics [Internet]. 2021;8:7–12.
101. Demetrashvili Z, Kenchadze G, Pipia I, Ekaladze E, Kamkamidze G. Management Of Appendiceal Mass And Abscess. An 11-Year Experience. Int Surg [Internet]. 2015;100:1021–5.
102. Malik AA, Wani ML, Wani SN, Parray FQ, Nayeem-Ul-Hassan, Irshad I. Evaluating Conservative Treatment For Acute Appendicitis With Lump Formation. J Emerg Trauma Shock [Internet]. 2012;5:33–5.
103. Gedam BS, Gujela A, Bansod PY, Akhtar M. Study Of Conservative Treatment In Uncomplicated Acute Appendicitis. International Surgery Journal [Internet]. 2017;4:1409–16.
104. Oliak D, Yamini D, Udani VM, Lewis RJ, Vargas H, Arnell T, Et Al. Nonoperative Management Of Perforated Appendicitis Without Periappendiceal Mass. Am J Surg. 2000;179:177–81.
105. Agrawal V, Acharya H, Chanchlani R, Sharma D. Early Laparoscopic Management Of Appendicular Mass In Children: Still A Taboo, Or Time For A Change In Surgical Philosophy? J Minim Access Surg. 2016;12:98.

| | | | | | | | CHIEF COMPLAINTS OF PRESENTATION | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SR. NO | MRD NO | NAME | AGE | SEX | DOA | DOD | PAIN ABDOMEN | FEVER | VOMITTING | DYSURIA | CONSTIPATION | NAUSEA | LOOSE STOOL |
| 1 | 1735180 | PKV | 54 | M | 16-05-24 | 20-05-24 | SUBACUTE | YES | NO | NO | NO | Yes | NO |
| 2 | 1733323 | AK | 56 | F | 13-05-24 | 19-05-24 | SUBACUTE | YES | yes | NO | NO | YES | NO |
| 3 | 689043 | P | 22 | F | 11-05-24 | 16-05-24 | ACUTE | YES | YES | YES | NO | NO | NO |
| 4 | 1728558 | CS | 89 | M | 06-05-24 | 12-05-24 | SUBACUTE | YES | NO | NO | YES | NO | NO |
| 5 | 1726513 | KK | 69 | M | 03-05-24 | 11-05-24 | ACUTE | YES | NO | NO | NO | NO | YES |
| 6 | 1721418 | SK | 71 | F | 03-05-24 | 07-05-24 | Subacute | NO | NO | NO | NO | NO | NO |
| 7 | 1716792 | BR | 70 | F | 18-04-24 | 21-04-24 | ACUTE | NO | NO | NO | NO | NO | NO |
| 8 | 1710097 | AS | 57 | M | 08-04-24 | 11-04-24 | SUBACUTE | NO | NO | NO | NO | NO | NO |
| 9 | 1708235 | VG | 37 | M | 04-04-24 | 09-04-24 | SUBACUTE | YES | NO | NO | NO | NO | NO |
| 10 | 1705923 | GS | 32 | M | 01-04-24 | 08-04-24 | ACUTE | NO | NO | NO | NO | YES | NO |
| 11 | 695704 | JA | 54 | M | 21-03-24 | 25-03-24 | SUBACUTE | YES | YES | NO | NO | YES | NO |
| 12 | 1591425 | JS | 20 | M | 15-01-24 | 22-01-24 | SUBACUTE | YES | YES | NO | NO | YES | NO |
| 13 | 1581340 | BK | 25 | F | 09-01-24 | 15-01-24 | SUBACUTE | NO | NO | NO | NO | NO | YES |
| 14 | 133545 | BK | 65 | M | 08-01-24 | 15-01-24 | ACUTE | NO | NO | NO | NO | NO | NO |
| 15 | 122856 | JK | 47 | M | 30-12-22 | 04-01-23 | SUBACUTE | NO | NO | NO | NO | NO | YES |
| 16 | 1676519 | HK | 28 | F | 22-12-23 | 29-12-23 | SUBACUTE | NO | NO | NO | NO | NO | YES |
| 17 | 1636859 | NS | 17 | M | 11-12-23 | 18-12-23 | ACUTE | YES | NO | NO | NO | NO | NO |
| 18 | 1637111 | SS | 33 | M | 11-12-23 | 20-12-23 | SUBACUTE | YES | NO | NO | NO | NO | NO |
| 19 | 1634837 | VT | 51 | M | 07-12-23 | 14-12-23 | SUBACUTE | YES | NO | NO | NO | NO | NO |
| 20 | 1625670 | MS | 45 | F | 19-11-23 | 24-11-23 | ACUTE | NO | NO | NO | ON | NO | YES |
| 21 | 1438655 | MS | 31 | M | 18-11-23 | 24-11-23 | ACUTE | NO | NO | NO | NO | NO | NO |
| 22 | 1431355 | JK | 21 | F | 06-11-23 | 11-11-23 | SUBACUTE | NO | NO | NO | NO | NO | YES |
| 23 | 1619828 | MK | 24 | F | 05-11-23 | 10-11-23 | ACUTE | NO | NO | NO | NO | NO | NO |
| 24 | 1602120 | CS | 33 | M | 20-09-23 | 25-09-23 | ACUTE | YES | NO | NO | NO | NO | NO |

| | | | | | | | CLINICAL EXAMINATION | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SR. NO | MRD NO | NAME | AGE | DURATION | COMORBIDITIES | PAST HISTORY OF SURGERY | BP | | HR | SPO2 | RR |
| 1 | 1735180 | PKV | 54 | 60 | NO | FISTULECTOMY | 110 | 70 | 120 | 99 | 24 |
| 2 | 1733323 | AK | 56 | 14 | TYPE 2 DM | NIL | 120 | 80 | 110 | 98 | 20 |
| 3 | 689043 | P | 22 | 6 | NO | NIL | 110 | 70 | 104 | 94 | 20 |
| 4 | 1728558 | CS | 89 | 30 | HYPERTENSION | BL INGUINAL HERNIA | 90 | 50 | 94 | 94 | 18 |
| 5 | 1726513 | KK | 69 | 4 | HYPERTENSION | NIL | 130 | 80 | 116 | 94 | 24 |
| 6 | 1721418 | SK | 71 | 30 | TYPE 2 DM, HYPERTENSION, PANCREATITIS | SEPTOPLASTY | 120 | 80 | 105 | 95 | 18 |
| 7 | 1716792 | BR | 70 | 8 | NO | TUBECTOMY | 110 | 80 | 88 | 98 | 20 |
| 8 | 1710097 | AS | 57 | 13 | HYPERTENSION | HAEMORRHOIDECTOMY | 120 | 80 | 92 | 98 | 20 |
| 9 | 1708235 | VG | 37 | 14 | NO | LAP CHOLECYSTECTOMY | 110 | 70 | 120 | 98 | 24 |
| 10 | 1705923 | GS | 32 | 8 | NO | NIL | 130 | 80 | 96 | 94 | 20 |
| 11 | 695704 | JA | 54 | 30 | NO | LAP CHOLECYSTECTOMY | 126 | 80 | 122 | 98 | 24 |
| 12 | 1591425 | JS | 20 | 10 | NO | RIGHT ELBOW | 110 | 70 | 92 | 98 | 24 |
| 13 | 1581340 | BK | 25 | 10 | NO | NO | 120 | 80 | 110 | 98 | 24 |
| 14 | 133545 | BK | 65 | 5 | TYPE 2 DM, HYPERTENSION, CAD | PTCA STENTING | 120 | 80 | 94 | 98 | 18 |
| 15 | 122856 | JK | 47 | 18 | NO | NO | 110 | 84 | 118 | 92 | 22 |
| 16 | 1676519 | HK | 28 | 30 | NO | NO | 110 | 80 | 88 | 96 | 24 |
| 17 | 1636859 | NS | 17 | 4 | NO | NO | 100 | 60 | 108 | 95 | 24 |
| 18 | 1637111 | SS | 33 | 30 | NO | NO | 110 | 70 | 121 | 96 | 20 |
| 19 | 1634837 | VT | 51 | 60 | NO | NO | 150 | 80 | 82 | 93 | 24 |
| 20 | 1625670 | MS | 45 | 10 | BRONCHIAL ASTHMA | NO | 100 | 60 | 110 | 92 | 26 |
| 21 | 1438655 | MS | 31 | 7 | NO | NO | 140 | 90 | 98 | 98 | 20 |
| 22 | 1431355 | JK | 21 | 15 | NO | NO | 120 | 80 | 100 | 96 | 24 |
| 23 | 1619828 | MK | 24 | 6 | NO | NO | 100 | 60 | 90 | 94 | 24 |
| 24 | 1602120 | CS | 33 | 4 | NO | NO | 120 | 80 | 100 | 94 | 28 |

| | | | | PER ABDOMENFINDING | | | INVESTIGATION | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SR. NO | MRD NO | NAME | AGE | TENDERNESS | REBOUND TENDERNESS | LUMP | HEMOGLOBIN | TLC | AST | ALT | S. CREATININE | S. SODIUM | S. POTASSIUM |
| 1 | 1735180 | PKV | 54 | yes | yes | yes | 11.1 | 17.8 | 42 | 44 | 0.92 | 142 | 3.96 |
| 2 | 1733323 | AK | 56 | YES | NO | YES | 12.8 | 16.8 | 37 | 38 | 0.8 | 136 | 4.9 |
| 3 | 689043 | P | 22 | YES | YES | NO | 11.4 | 16.1 | 14 | 10 | 0.43 | 137 | 9.54 |
| 4 | 1728558 | CS | 89 | YES | NO | YES | 10.7 | 14.1 | 50 | 54 | 3.56 | 135 | 4.89 |
| 5 | 1726513 | KK | 69 | YES | NO | NO | 14.4 | 13.8 | 14 | 18 | 0.9 | 140 | 3.8 |
| 6 | 1721418 | SK | 71 | YES | YES | NO | 11 | 11.9 | 24 | 21 | 1.52 | 105 | 4.86 |
| 7 | 1716792 | BR | 70 | YES | NO | YES | 12.2 | 14.4 | 37 | 38 | 0.9 | 136 | 3.7 |
| 8 | 1710097 | AS | 57 | YES | NO | YES | 14.8 | 13.6 | 97 | 36 | 0.6 | 136 | 4.9 |
| 9 | 1708235 | VG | 37 | YES | NO | YES | 13.6 | 12.9 | 17 | 18 | 0.6 | 136 | 3.9 |
| 10 | 1705923 | GS | 32 | YES | YES | YES | 11.36 | 13.3 | 25 | 10 | 1 | 139 | 4.65 |
| 11 | 695704 | JA | 54 | YES | NO | YES | 14.1 | 14.8 | 33 | 63 | 0.9 | 139 | 3.8 |
| 12 | 1591425 | JS | 20 | YES | YES | NO | 14.8 | 15.1 | 37 | 38 | 0.8 | 136 | 3.9 |
| 13 | 1581340 | BK | 25 | YES | NO | YES | 13.4 | 12.6 | 36 | 32 | 0.6 | 139 | 3.8 |
| 14 | 133545 | BK | 65 | YES | YES | NO | 13.7 | 12.2 | 27 | 20 | 0.72 | 141 | 4.92 |
| 15 | 122856 | JK | 47 | YES | YES | NO | 12.2 | 13.2 | 38 | 32 | 0.9 | 131 | 4.2 |
| 16 | 1676519 | HK | 28 | YES | YES | YES | 9.1 | 12.2 | 32 | 54 | 0.7 | 139 | 4.2 |
| 17 | 1636859 | NS | 17 | YES | YES | YES | 11.8 | 19.2 | 39 | 40 | 0.9 | 136 | 5 |
| 18 | 1637111 | SS | 33 | YES | NO | YES | 12.2 | 18.2 | 39 | 42 | 0.7 | 131 | 3.5 |
| 19 | 1634837 | VT | 51 | YES | YES | Yes | 14.2 | 16.2 | 48 | 47 | 0.6 | 137 | 3.6 |
| 20 | 1625670 | MS | 45 | YES | YES | YES | 10.8 | 16.5 | 35 | 39 | 0.6 | 137 | 3.8 |
| 21 | 1438655 | MS | 31 | YES | NO | YES | 15.4 | 19.8 | 38 | 39 | 0.6 | 138 | 4.9 |
| 22 | 1431355 | JK | 21 | YES | YES | NO | 13.4 | 13.2 | 16 | 17 | 0.6 | 137 | 4.8 |
| 23 | 1619828 | MK | 24 | YES | NO | YES | 12.8 | 13.3 | 18 | 20 | 0.88 | 136 | 4.2 |
| 24 | 1602120 | CS | 33 | YES | YES | YES | 14.8 | 17.5 | 18 | 20 | 0.7 | 138 | 4 |

| | | | | | USG FINDING/ CT ABDOMEN | | | | INTRA OPERATIVE FINDING |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | POSITION OF APPENDIX |
| SR. NO | MRD NO | NAME | AGE | S. CHLORIDE | Periappendicular collection | Caecal/Appendicular Gangrene | Pelvic Collection | Intestinal Obstruction | |
| 1 | 1735180 | PKV | 54 | 97 | yes | NO | yes | no | RETROCAECAL |
| 2 | 1733323 | AK | 56 | 96 | YES | NO | NO | NO | PARACAECAL |
| 3 | 689043 | P | 22 | 102 | YES | NO | YES | NO | RETROCAECAL |
| 4 | 1728558 | CS | 89 | 102 | YES | NO | NO | NO | RETROCAECAL |
| 5 | 1726513 | KK | 69 | 96 | YES | YES | YES | NO | SUBCAECAL |
| 6 | 1721418 | SK | 71 | 139 | YES | NO | YES | NO | SUBCAECAL |
| 7 | 1716792 | BR | 70 | 100 | YES | NO | NO | NO | PELVIC |
| 8 | 1710097 | AS | 57 | 96 | YES | NO | NO | NO | RETROCAECAL |
| 9 | 1708235 | VG | 37 | 99 | YES | NO | NO | NO | PELVIC |
| 10 | 1705923 | GS | 32 | 105 | YES | NO | YES | NO | RETROCAECAL |
| 11 | 695704 | JA | 54 | 101 | YES | NO | NO | NO | RETROCAECAL |
| 12 | 1591425 | JS | 20 | 100 | YES | YES | YES | NO | SUBCAECALL |
| 13 | 1581340 | BK | 25 | 99 | YES | NO | NO | NO | RETROCAECAL |
| 14 | 133545 | BK | 65 | 105 | YES | YES | YES | NO | RETROCAECAL |
| 15 | 122856 | JK | 47 | 99 | YES | NO | YES | NO | RETROCAECAL |
| 16 | 1676519 | HK | 28 | 104 | YES | NO | YES | NO | RETROCAECAL |
| 17 | 1636859 | NS | 17 | 99 | YES | YES | NO | NO | PELVIC |
| 18 | 1637111 | SS | 33 | 97 | YES | NO | NO | NO | RETROCAECAL |
| 19 | 1634837 | VT | 51 | 99 | YES | YES | YES | NO | PELVIC |
| 20 | 1625670 | MS | 45 | 100 | YES | YES | YES | NO | RETROCAECAL |
| 21 | 1438655 | MS | 31 | 99 | YES | NO | NO | NO | PELVIC |
| 22 | 1431355 | JK | 21 | 100 | YES | NO | YES | NO | RETROCAECAL |
| 23 | 1619828 | MK | 24 | 99 | YES | YES | NO | NO | RETROCAECAL |
| 24 | 1602120 | CS | 33 | 96 | YES | NO | YES | NO | RETROCAECAL |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **SITE OF RUPTURE** | **ADHERENT TO** | | | | **DIFFICULTY ADHESIOLYSIS** | **DIFFICULTY LOCALISING APPENDIX** | **CAECAL GANGRENE** |
| **SR. NO** | **MRD NO** | **NAME** | **AGE** | | **OMENTUM** | **CAECUM** | **ILEUM** | **COLON** | | | |
| 1 | 1735180 | PKV | 54 | BASE | yes | yes | no | yes | NO | YES | yes |
| 2 | 1733323 | AK | 56 | TIP | YES | NO | YES | NO | NO | NO | NO |
| 3 | 689043 | P | 22 | TIP | YES | NO | YES | NO | NO | NO | NO |
| 4 | 1728558 | CS | 89 | TIP | YES | YES | NO | NO | NO | YES | NO |
| 5 | 1726513 | KK | 69 | MIDDLE | NO | YES | YES | NO | YES | YES | YES |
| 6 | 1721418 | SK | 71 | TIP | YES | YES | NO | NO | NO | NO | NO |
| 7 | 1716792 | BR | 70 | TIP | YES | NO | YES | NO | NO | NO | NO |
| 8 | 1710097 | AS | 57 | TIP | YES | YES | NO | NO | NO | NO | NO |
| 9 | 1708235 | VG | 37 | BASE | YES | YES | NO | YES | NO | NO | NO |
| 10 | 1705923 | GS | 32 | MIDDLE | YES | NO | YES | NO | NO | NO | NO |
| 11 | 695704 | JA | 54 | TIP | YES | YES | NO | NO | NO | NO | NO |
| 12 | 1591425 | JS | 20 | BASE | YES | YES | YES | NO | YES | YES | YES |
| 13 | 1581340 | BK | 25 | TIP | YES | YES | YES | NO | NO | NO | NO |
| 14 | 133545 | BK | 65 | TIP | YES | NO | NO | YES | YES | YES | YES |
| 15 | 122856 | JK | 47 | TIP | YES | NO | YES | NO | YES | NO | NO |
| 16 | 1676519 | HK | 28 | TIP | YES | YES | NO | NO | NO | NO | NO |
| 17 | 1636859 | NS | 17 | BASE | YES | YES | YES | NO | YES | YES | YES |
| 18 | 1637111 | SS | 33 | MIDDLE | YES | YES | YES | NO | NO | NO | NO |
| 19 | 1634837 | VT | 51 | BASE | YES | YES | YES | NO | YES | YES | YES |
| 20 | 1625670 | MS | 45 | MIDDLE | YES | YES | YES | NO | YES | YES | YES |
| 21 | 1438655 | MS | 31 | TIP | YES | NO | YES | NO | NO | NO | NO |
| 22 | 1431355 | JK | 21 | MIDDLE | YES | YES | NO | NO | NO | NO | NO |
| 23 | 1619828 | MK | 24 | BASE | YES | YES | NO | NO | NO | NO | NO |
| 24 | 1602120 | CS | 33 | TIP | YES | NO | NO | NO | NO | NO | NO |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | OPERATING TIME (MINUTES) | NEED FOR LAPROSCOPIC TO OPEN CONVERSION | NEED FOR STOMA FORMATION | ANY OTHER COMPLICATION | DURATION OF HOSPITAL STAY IN DAYS | POST OP DAY WHEN PATIENT WAS STARTED ON SEMI SOLID DIET | CASES WHERE READMISSION WAS REQUIRED |
| SR. NO | MRD NO | NAME | AGE | | | | | | | |
| 1 | 1735180 | PKV | 54 | 94 | NO | NO | NO | 5 | 2 | NO |
| 2 | 1733323 | AK | 56 | 80 | NO | NO | NO | 6 | 3 | NO |
| 3 | 689043 | P | 22 | 75 | NO | NO | NO | 5 | 3 | NO |
| 4 | 1728558 | CS | 89 | 97 | NO | NO | NO | 6 | 3 | NO |
| 5 | 1726513 | KK | 69 | 110 | NO | NO | NO | 8 | 4 | NO |
| 6 | 1721418 | SK | 71 | 80 | NO | NO | YES | 4 | 2 | NO |
| 7 | 1716792 | BR | 70 | 90 | NO | NO | NO | 3 | 2 | NO |
| 8 | 1710097 | AS | 57 | 70 | NO | NO | NO | 3 | 2 | NO |
| 9 | 1708235 | VG | 37 | 115 | NO | NO | NO | 5 | 3 | NO |
| 10 | 1705923 | GS | 32 | 105 | NO | NO | NO | 7 | 2 | NO |
| 11 | 695704 | JA | 54 | 95 | NO | NO | NO | 4 | 2 | NO |
| 12 | 1591425 | JS | 20 | 152 | YES | YES | YES | 9 | 3 | NO |
| 13 | 1581340 | BK | 25 | 80 | NO | NO | NO | 6 | 2 | NO |
| 14 | 133545 | BK | 65 | 85 | NO | NO | NO | 7 | 3 | NO |
| 15 | 122856 | JK | 47 | 122 | NO | NO | NO | 6 | 4 | NO |
| 16 | 1676519 | HK | 28 | 98 | NO | NO | NO | 7 | 3 | NO |
| 17 | 1636859 | NS | 17 | 155 | YES | NO | NO | 7 | 3 | NO |
| 18 | 1637111 | SS | 33 | 120 | NO | NO | NO | 7 | 4 | NO |
| 19 | 1634837 | VT | 51 | 145 | NO | NO | NO | 7 | 5 | NO |
| 20 | 1625670 | MS | 45 | 152 | YES | NO | YES | 5 | 3 | NO |
| 21 | 1438655 | MS | 31 | 88 | NO | NO | NO | 6 | 2 | NO |
| 22 | 1431355 | JK | 21 | 70 | NO | NO | NO | 5 | 3 | NO |
| 23 | 1619828 | MK | 24 | 102 | NO | NO | NO | 5 | 3 | NO |
| 24 | 1602120 | CS | 33 | 61 | NO | NO | NO | 5 | 2 | NO |

| | | | | | | | CHIEF COMPLAINTS OF PRESENTATION | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SR. NO | MRD NO | NAME | AGE | SEX | DOA | DOD | PAIN ABDOMEN | FEVER | VOMITTING | DYSURIA | CONSTIPATION | NAUSEA | LOOSE STOOL |
| 25 | 1591890 | PS | 24 | M | 14-09-23 | 20-09-23 | SUBACUTE | NO | NO | NO | YES | NO | NO |
| 26 | 1591004 | PC | 38 | M | 13-09-23 | 17-09-23 | SUBACUTE | NO | NO | NO | NO | NO | NO |
| 27 | 1587950 | SK | 45 | M | 11-09-23 | 19-09-23 | ACUTE | NO | YES | NO | NO | NO | NO |
| 28 | 1581119 | BS | 70 | M | 31-08-23 | 07-09-23 | ACUTE | NO | NO | NO | YES | NO | NO |
| 29 | 1580388 | JK | 18 | F | 30-08-23 | 03-09-23 | SUBACUTE | NO | YES | NO | NO | NO | NO |
| 30 | 1539708 | RS | 75 | M | 29-08-23 | 01-09-23 | SUBACUTE | YES | NO | NO | NO | NO | NO |
| 31 | 1558929 | SS | 28 | M | 25-07-23 | 29-07-23 | ACUTE | NO | NO | NO | NO | NO | NO |
| 32 | 1561014 | SS | 26 | M | 24-07-23 | 30-07-23 | SUBACUTE | NO | NO | NO | NO | NO | NO |
| 33 | 1555475 | MK | 50 | F | 19-07-23 | 23-07-23 | ACUTE | NO | NO | NO | NO | NO | NO |
| 34 | 778404 | PG | 18 | M | 15-07-23 | 19-07-23 | SUBACUTE | NO | NO | NO | NO | NO | NO |
| 35 | 760538 | LK | 24 | F | 15-07-23 | 19-07-23 | SUBACUTE | NO | YES | NO | NO | NO | NO |
| 36 | 759548 | MA | 20 | M | 14-07-23 | 17-07-23 | ACUTE | NO | YES | NO | NO | NO | NO |
| 37 | 1548622 | NK | 26 | F | 07-07-23 | 10-07-23 | ACUTE | YES | NO | NO | NO | NO | NO |
| 38 | 1548483 | A | 42 | M | 07-07-23 | 11-07-23 | ACUTE | NO | YES | NO | NO | NO | NO |
| 39 | 1394838 | HV | 18 | M | 07-07-23 | 11-07-23 | SUBACUTE | YES | YES | NO | NO | NO | NO |
| 40 | 1563998 | P | 21 | F | 03-07-23 | 09-07-23 | SUBACUTE | YES | NO | NO | NO | NO | NO |
| 41 | 1563762 | SK | 22 | M | 03-07-23 | 08-07-23 | SUBACUTE | NO | NO | NO | NO | NO | NO |
| 42 | 1543076 | JS | 58 | M | 28-06-23 | 02-07-23 | SUBACUTE | NO | NO | NO | NO | NO | NO |
| 43 | 1533076 | KB | 55 | F | 16-05-23 | 21-05-23 | SUBACUTE | NO | NO | NO | NO | NO | NO |
| 44 | 1515528 | SR | 48 | F | 11-04-23 | 17-04-23 | SUBACUTE | NO | NO | YES | NO | NO | NO |
| 45 | 1489192 | R | 35 | F | 06-04-23 | 13-04-23 | ACUTE | YES | NO | NO | NO | NO | NO |
| 46 | 1709892 | GA | 37 | M | 06-04-24 | 13-04-24 | SUBACUTE | YES | NO | NO | NO | NO | NO |
| 47 | 1482093 | IB | 37 | M | 24-03-23 | 28-03-23 | SUBACUTE | NO | NO | NO | NO | NO | NO |
| 48 | 1575120 | KK | 57 | M | 21-03-23 | 26-03-23 | SUBACUTE | NO | NO | NO | NO | NO | NO |

| | | | | | | | CLINICAL EXAMINATION | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SR. NO | MRD NO | NAME | AGE | DURATION | COMORBIDITIES | PAST HISTORY OF SURGERY | BP | | HR | SPO2 | RR |
| 25 | 1591890 | PS | 24 | 60 | NO | NO | 120 | 90 | 88 | 98 | 24 |
| 26 | 1591004 | PC | 38 | 15 | NO | NO | 130 | 90 | 88 | 96 | 18 |
| 27 | 1587950 | SK | 45 | 5 | NO | NO | 120 | 70 | 121 | 99 | 22 |
| 28 | 1581119 | BS | 70 | 5 | CAD, CABG | CABG | 140 | 80 | 92 | 99 | 24 |
| 29 | 1580388 | JK | 18 | 8 | NO | NO | 100 | 60 | 99 | 92 | 20 |
| 30 | 1539708 | RS | 75 | 30 | HYPERTENSION | NO | 140 | 90 | 101 | 98 | 22 |
| 31 | 1558929 | SS | 28 | 7 | NO | NO | 110 | 90 | 100 | 99 | 16 |
| 32 | 1561014 | SS | 26 | 60 | NO | NO | 100 | 60 | 98 | 95 | 28 |
| 33 | 1555475 | MK | 50 | 5 | MORBID OBESITY | NO | 100 | 60 | 94 | 98 | 24 |
| 34 | 778404 | PG | 18 | 8 | NO | FRACTURE FEMUR | 110 | 70 | 90 | 98 | 22 |
| 35 | 760538 | LK | 24 | 4 | NO | NO | 110 | 70 | 114 | 95 | 22 |
| 36 | 759548 | MA | 20 | 5 | NO | NO | 120 | 70 | 132 | 99 | 20 |
| 37 | 1548622 | NK | 26 | 7 | NO | NO | 90 | 60 | 108 | 96 | 24 |
| 38 | 1548483 | A | 42 | 5 | NO | RIGHT INGUIANL HERNIOPLASTY | 130 | 80 | 110 | 97 | 24 |
| 39 | 1394838 | HV | 18 | 30 | NO | CHIDECTOMY FOR RIGHT TESTICUL | 110 | 70 | 91 | 94 | 26 |
| 40 | 1563998 | P | 21 | 60 | NO | NO | 130 | 80 | 108 | 92 | 24 |
| 41 | 1563762 | SK | 22 | 60 | NO | NO | 130 | 80 | 82 | 98 | 20 |
| 42 | 1543076 | JS | 58 | 7 | NO | NO | 130 | 90 | 107 | 96 | 18 |
| 43 | 1533076 | KB | 55 | 9 | NO | FISTULECTOMY | 110 | 70 | 80 | 98 | 20 |
| 44 | 1515528 | SR | 48 | 8 | NO | NO | 120 | 90 | 100 | 94 | 24 |
| 45 | 1489192 | R | 35 | 6 | NO | NO | 130 | 80 | 76 | 96 | 20 |
| 46 | 1709892 | GA | 37 | 7 | NO | NO | 130 | 80 | 76 | 98 | 20 |
| 47 | 1482093 | IB | 37 | 30 | NO | LAP CHOLECYSTECTOMY | 128 | 80 | 122 | 94 | 24 |
| 48 | 1575120 | KK | 57 | 8 | NO | NO | 120 | 90 | 92 | 98 | 23 |

| | | | | PER ABDOMENFINDING | | | INVESTIGATION | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SR. NO | MRD NO | NAME | AGE | TENDERNESS | REBOUND TENDERNESS | LUMP | HEMOGLOBIN | TLC | AST | ALT | S. CREATININE | S. SODIUM | S. POTASSIUM |
| 25 | 1591890 | PS | 24 | YES | YES | NO | 13.8 | 15.9 | 37 | 39 | 0.7 | 137 | 4 |
| 26 | 1591004 | PC | 38 | YES | YES | YES | 9.9 | 12.1 | 132 | 126 | 0.6 | 141 | 37 |
| 27 | 1587950 | SK | 45 | YES | YES | NO | 10.2 | 16.8 | 44 | 51 | 0.6 | 139 | 4.4 |
| 28 | 1581119 | BS | 70 | YES | NO | YES | 11.8 | 10.6 | 54 | 55 | 0.8 | 136 | 3.5 |
| 29 | 1580388 | JK | 18 | YES | YES | YES | 10.8 | 12.2 | 98 | 92 | 1.1 | 134 | 4.9 |
| 30 | 1539708 | RS | 75 | YES | NO | YES | 12.1 | 6.3 | 92 | 122 | 0.9 | 129 | 3.9 |
| 31 | 1558929 | SS | 28 | YES | YES | NO | 13.6 | 9.08 | 23 | 25 | 0.84 | 138 | 4.3 |
| 32 | 1561014 | SS | 26 | YES | YES | YES | 14.8 | 12.8 | 36 | 40 | 0.6 | 136 | 3.6 |
| 33 | 1555475 | MK | 50 | YES | YES | NO | 10.5 | 12 | 32 | 42 | 0.86 | 136 | 4.1 |
| 34 | 778404 | PG | 18 | YES | YES | YES | 13.8 | 12.8 | 37 | 38 | 0.6 | 135 | 3.9 |
| 35 | 760538 | LK | 24 | YES | YES | NO | 11.2 | 13.8 | 33 | 30 | 0.7 | 133 | 4.9 |
| 36 | 759548 | MA | 20 | YES | NO | YES | 10.8 | 12.2 | 39 | 36 | 1.1 | 136 | 3.9 |
| 37 | 1548622 | NK | 26 | YES | NO | YES | 12.2 | 12.4 | 37 | 38 | 0.6 | 136 | 3.96 |
| 38 | 1548483 | A | 42 | YES | YES | NO | 12.4 | 12.7 | 36 | 39 | 0.82 | 137 | 3.8 |
| 39 | 1394838 | HV | 18 | YES | NO | YES | 14.1 | 12.8 | 34 | 37 | 0.6 | 1369 | 3.6 |
| 40 | 1563998 | P | 21 | YES | NO | NO | 11 | 10.8 | 35 | 34 | 0.6 | 136 | 4.8 |
| 41 | 1563762 | SK | 22 | YES | YES | NO | 11 | 12.2 | 40 | 38 | 0.6 | 138 | 3.6 |
| 42 | 1543076 | JS | 58 | YES | YES | YES | 9.1 | 15.6 | 95 | 56 | 1.02 | 139 | 3.9 |
| 43 | 1533076 | KB | 55 | YES | NO | YES | 11.1 | 7.8 | 37 | 34 | 0.92 | 142 | 3.94 |
| 44 | 1515528 | SR | 48 | YES | YES | YES | 9.8 | 13.2 | 24 | 28 | 0.6 | 139 | 3.9 |
| 45 | 1489192 | R | 35 | YES | NO | NO | 12.4 | 15.5 | 26 | 27 | 0.74 | 139 | 4.14 |
| 46 | 1709892 | GA | 37 | YES | YES | YES | 12.4 | 15.5 | 15 | 17 | 0.7 | 136 | 4.13 |
| 47 | 1482093 | IB | 37 | YES | YES | YES | 14.1 | 15.8 | 33 | 43 | 0.9 | 136 | 3.9 |
| 48 | 1575120 | KK | 57 | YES | YES | YES | 14.8 | 17.6 | 38 | 37 | 0.8 | 136 | 3.8 |

| | | | | | USG FINDING/ CT ABDOMEN | | | | INTRA OPERATIVE FINDING |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | POSITION OF APPENDIX |
| SR. NO | MRD NO | NAME | AGE | S. CHLORIDE | Periappendicular collection | Caecal/Appendicular Gangrene | Pelvic Collection | Intestinal Obstruction | |
| 25 | 1591890 | PS | 24 | 98 | YES | NO | YES | NO | RETROCAECAL |
| 26 | 1591004 | PC | 38 | 103 | YES | NO | YES | NO | PELVIC |
| 27 | 1587950 | SK | 45 | 101 | YES | NO | YES | NO | RETROCAECAL |
| 28 | 1581119 | BS | 70 | 97 | YES | NO | NO | YES | PELVIC |
| 29 | 1580388 | JK | 18 | 101 | YES | NO | YES | NO | RETROCAECAL |
| 30 | 1539708 | RS | 75 | 139 | YES | NO | NO | NO | PELVIC |
| 31 | 1558929 | SS | 28 | 99 | YES | NO | YES | NO | RETROCAECAL |
| 32 | 1561014 | SS | 26 | 98 | YES | NO | YES | NO | RETROCAECAL |
| 33 | 1555475 | MK | 50 | 102 | YES | NO | YES | NO | RETROCAECAL |
| 34 | 778404 | PG | 18 | 100 | YES | NO | YES | NO | RETROCAECAL |
| 35 | 760538 | LK | 24 | 103 | YES | NO | YES | NO | PELVIC |
| 36 | 759548 | MA | 20 | 101 | YES | NO | NO | NO | RETROCAECAL |
| 37 | 1548622 | NK | 26 | 97 | YES | NO | NO | NO | PELVIC |
| 38 | 1548483 | A | 42 | 107 | YES | NO | YES | NO | RETROCAECAL |
| 39 | 1394838 | HV | 18 | 98 | YES | NO | NO | NO | RETROCAECAL |
| 40 | 1563998 | P | 21 | 96 | YES | YES | YES | NO | PELVIC |
| 41 | 1563762 | SK | 22 | 100 | YES | NO | YES | NO | RETROCAECAL |
| 42 | 1543076 | JS | 58 | 101 | YES | NO | YES | NO | RETROCAECAL |
| 43 | 1533076 | KB | 55 | 97 | YES | YES | NO | NO | RETROCAECAL |
| 44 | 1515528 | SR | 48 | 98 | YES | NO | NO | NO | RETROCAECAL |
| 45 | 1489192 | R | 35 | 106 | YES | NO | YES | NO | RETROCAECAL |
| 46 | 1709892 | GA | 37 | 99 | YES | NO | YES | NO | PELVIC |
| 47 | 1482093 | IB | 37 | 103 | YES | NO | YES | NO | RETROCAECAL |
| 48 | 1575120 | KK | 57 | 100 | YES | NO | NO | NO | RETROCAECAL |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | SITE OF RUPTURE | ADHERENT TO | | | | DIFFICULTY ADHESIOLYSIS | DIFFICULTY LOCALISING APPENDIX | CAECAL GANGRENE |
| SR. NO | MRD NO | NAME | AGE | | OMENTUM | CAECUM | ILEUM | COLON | | | |
| 25 | 1591890 | PS | 24 | BASE | YES | YES | YES | NO | YES | NO | NO |
| 26 | 1591004 | PC | 38 | TIP | YES | NO | YES | NO | YES | NO | NO |
| 27 | 1587950 | SK | 45 | BASE | YES | YES | YES | NO | YES | YES | YES |
| 28 | 1581119 | BS | 70 | TIP | YES | NO | YES | NO | YES | NO | NO |
| 29 | 1580388 | JK | 18 | TIP | YES | NO | NO | NO | NO | NO | NO |
| 30 | 1539708 | RS | 75 | TIP | YES | NO | YES | NO | NO | NO | NO |
| 31 | 1558929 | SS | 28 | TIP | YES | NO | YES | NO | NO | YES | NO |
| 32 | 1561014 | SS | 26 | TIP | YES | NO | NO | NO | NO | NO | NO |
| 33 | 1555475 | MK | 50 | TIP | YES | YES | NO | NO | YES | NO | NO |
| 34 | 778404 | PG | 18 | TIP | YES | YES | YES | NO | NO | NO | NO |
| 35 | 760538 | LK | 24 | TIP | YES | YES | NO | NO | NO | NO | NO |
| 36 | 759548 | MA | 20 | TIP | YES | YES | NO | NO | NO | NO | NO |
| 37 | 1548622 | NK | 26 | TIP | YES | NO | NO | NO | NO | NO | NO |
| 38 | 1548483 | A | 42 | TIP | YES | YES | NO | NO | NO | YES | NO |
| 39 | 1394838 | HV | 18 | TIP | YES | YES | NO | NO | NO | NO | NO |
| 40 | 1563998 | P | 21 | BASE | YES | YES | YES | NO | YES | YES | YES |
| 41 | 1563762 | SK | 22 | BASE | YES | YES | NO | NO | YES | NO | NO |
| 42 | 1543076 | JS | 58 | TIP | YES | NO | NO | NO | NO | NO | NO |
| 43 | 1533076 | KB | 55 | TIP | YES | YES | NO | NO | NO | YES | NO |
| 44 | 1515528 | SR | 48 | BASE | YES | YES | NO | NO | NO | NO | NO |
| 45 | 1489192 | R | 35 | TIP | YES | NO | NO | NO | NO | NO | NO |
| 46 | 1709892 | GA | 37 | TIP | YES | YES | YES | NO | YES | NO | NO |
| 47 | 1482093 | IB | 37 | TIP | YES | YES | NO | NO | YES | NO | NO |
| 48 | 1575120 | KK | 57 | TIP | YES | YES | NO | NO | NO | NO | NO |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | OPERATING TIME (MINUTES) | NEED FOR LAPROSCOPIC TO OPEN CONVERSION | NEED FOR STOMA FORMATION | ANY OTHER COMPLICATION | DURATION OF HOSPITAL STAY IN DAYS | POST OP DAY WHEN PATIENT WAS STARTED ON SEMI SOLID DIET | CASES WHERE READMISSION WAS REQUIRED |
| SR. NO | MRD NO | NAME | AGE | | | | | | | |
| 25 | 1591890 | PS | 24 | 125 | NO | NO | NO | 6 | 3 | NO |
| 26 | 1591004 | PC | 38 | 95 | NO | NO | NO | 4 | 3 | NO |
| 27 | 1587950 | SK | 45 | 136 | YES | NO | NO | 8 | 4 | NO |
| 28 | 1581119 | BS | 70 | 115 | NO | NO | NO | 7 | 4 | NO |
| 29 | 1580388 | JK | 18 | 78 | NO | NO | NO | 4 | 2 | NO |
| 30 | 1539708 | RS | 75 | 75 | NO | NO | NO | 3 | 2 | NO |
| 31 | 1558929 | SS | 28 | 85 | NO | NO | NO | 4 | 2 | NO |
| 32 | 1561014 | SS | 26 | 75 | NO | NO | NO | 6 | 2 | NO |
| 33 | 1555475 | MK | 50 | 85 | NO | NO | YES | 4 | 2 | NO |
| 34 | 778404 | PG | 18 | 100 | NO | NO | NO | 4 | 2 | NO |
| 35 | 760538 | LK | 24 | 59 | NO | NO | NO | 4 | 3 | NO |
| 36 | 759548 | MA | 20 | 68 | NO | NO | NO | 3 | 2 | NO |
| 37 | 1548622 | NK | 26 | 62 | NO | NO | NO | 3 | 2 | NO |
| 38 | 1548483 | A | 42 | 96 | NO | NO | NO | 4 | 3 | NO |
| 39 | 1394838 | HV | 18 | 84 | NO | NO | NO | 4 | 2 | NO |
| 40 | 1563998 | P | 21 | 155 | NO | NO | NO | 6 | 4 | NO |
| 41 | 1563762 | SK | 22 | 109 | NO | NO | NO | 5 | 3 | NO |
| 42 | 1543076 | JS | 58 | 75 | NO | NO | NO | 4 | 2 | NO |
| 43 | 1533076 | KB | 55 | 100 | NO | NO | NO | 5 | 3 | NO |
| 44 | 1515528 | SR | 48 | 95 | NO | NO | NO | 6 | 2 | NO |
| 45 | 1489192 | R | 35 | 95 | NO | NO | NO | 7 | 3 | NO |
| 46 | 1709892 | GA | 37 | 90 | NO | NO | NO | 7 | 2 | NO |
| 47 | 1482093 | IB | 37 | 96 | NO | NO | NO | 4 | 2 | NO |
| 48 | 1575120 | KK | 57 | 71 | NO | NO | NO | 5 | 2 | NO |

| | | | | | | | CHIEF COMPLAINTS OF PRESENTATION | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | |
| **SR. NO** | **MRD NO** | **NAME** | **AGE** | **SEX** | **DOA** | **DOD** | **PAIN ABDOMEN** | **FEVER** | **VOMITTING** | **DYSURIA** | **CONSTIPATION** | **NAUSEA** | **LOOSE STOOL** |
| 49 | 1479092 | PD | 46 | M | 11-03-23 | 17-03-23 | SUBACUTE | NO | YES | NO | NO | NO | NO |
| 50 | 1453666 | SK | 23 | F | 22-02-23 | 27-02-23 | SUBACUTE | NO | NO | NO | NO | NO | YES |
| 51 | 1452918 | AR | 54 | F | 22-02-23 | 28-02-23 | SUBACUTE | NO | NO | NO | NO | NO | YES |
| 52 | 1231355 | SR | 43 | F | 29-12-22 | 03-01-23 | ACUTE | NO | NO | NO | NO | NO | YES |
| 53 | 119956 | JK | 26 | F | 11-12-22 | 19-12-22 | SUBACUTE | YES | NO | NO | NO | NO | NO |
| 54 | 1416893 | HK | 30 | F | 18-11-22 | 23-11-22 | ACUTE | NO | NO | NO | NO | NO | NO |
| 55 | 1415990 | KK | 35 | F | 17-11-22 | 21-11-22 | SUBACUTE | YES | NO | NO | NO | NO | NO |

| | | | | | | | CLINICAL EXAMINATION | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | |
| **SR. NO** | **MRD NO** | **NAME** | **AGE** | **DURATION** | **COMORBIDITIES** | **PAST HISTORY OF SURGERY** | **BP** | | **HR** | **SPO2** | **RR** |
| 49 | 1479092 | PD | 46 | 15 | NO | HAEMORRHOIDECTOMY | 110 | 70 | 91 | 96 | 21 |
| 50 | 1453666 | SK | 23 | 7 | NO | NO | 110 | 70 | 94 | 96 | 24 |
| 51 | 1452918 | AR | 54 | 9 | NO | NO | 110 | 80 | 82 | 96 | 20 |
| 52 | 1231355 | SR | 43 | 5 | NO | NO | 110 | 70 | 118 | 92 | 22 |
| 53 | 119956 | JK | 26 | 10 | NO | NO | 110 | 70 | 92 | 96 | 22 |
| 54 | 1416893 | HK | 30 | 6 | NO | NO | 120 | 70 | 92 | 96 | 24 |
| 55 | 1415990 | KK | 35 | 8 | NO | LSCS | 120 | 70 | 92 | 96 | 24 |

| | | | | PER ABDOMENFINDING | | | INVESTIGATION | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SR. NO | MRD NO | NAME | AGE | TENDERNESS | REBOUND TENDERNESS | LUMP | HEMOGLOBIN | TLC | AST | ALT | S. CREATININE | S. SODIUM | S. POTASSIUM |
| 49 | 1479092 | PD | 46 | YES | YES | YES | 10.2 | 9.8 | 42 | 52 | 0.92 | 139 | 4.8 |
| 50 | 1453666 | SK | 23 | YES | YES | YES | 12 | 15.5 | 18 | 20 | 0.6 | 138 | 4 |
| 51 | 1452918 | AR | 54 | YES | NO | YES | 9.1 | 11.2 | 32 | 54 | 0.71 | 136 | 3.9 |
| 52 | 1231355 | SR | 43 | YES | YES | NO | 11.2 | 12.2 | 38 | 32 | 0.9 | 129 | 4.2 |
| 53 | 119956 | JK | 26 | YES | NO | YES | 12.2 | 18.2 | 39 | 42 | 0.7 | 131 | 3.5 |
| 54 | 1416893 | HK | 30 | YES | YES | NO | 10.8 | 12.2 | 24 | 32 | 0.8 | 136 | 3.8 |
| 55 | 1415990 | KK | 35 | YES | NO | YES | 9.8 | 11.2 | 24 | 32 | 0.9 | 129 | 3.9 |

| | | | | | USG FINDING/ CT ABDOMEN | | | | INTRA OPERATIVE FINDING |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | POSITION OF APPENDIX |
| SR. NO | MRD NO | NAME | AGE | S. CHLORIDE | Periappendicular collection | Caecal/Appendicular Gangrene | Pelvic Collection | Intestinal Obstruction | |
| 49 | 1479092 | PD | 46 | 103 | YES | NO | NO | NO | RETROCAECAL |
| 50 | 1453666 | SK | 23 | 99 | YES | NO | NO | NO | RETROCAECAL |
| 51 | 1452918 | AR | 54 | 101 | YES | NO | NO | NO | RETROCAECAL |
| 52 | 1231355 | SR | 43 | 95 | YES | NO | YES | NO | RETROCAECAL |
| 53 | 119956 | JK | 26 | 97 | YES | NO | NO | NO | RETROCAECAL |
| 54 | 1416893 | HK | 30 | 97 | YES | NO | YES | NO | PELVIC |
| 55 | 1415990 | KK | 35 | 96 | YES | NO | NO | NO | PELVIC |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **SITE OF RUPTURE** | **ADHERENT TO** | | | | **DIFFICULTY ADHESIOLYSIS** | **DIFFICULTY LOCALISING APPENDIX** | **CAECAL GANGRENE** |
| **SR. NO** | **MRD NO** | **NAME** | **AGE** | | **OMENTUM** | **CAECUM** | **ILEUM** | **COLON** | | | |
| 49 | 1479092 | PD | 46 | MIDDLE | YES | YES | NO | NO | YES | NO | NO |
| 50 | 1453666 | SK | 23 | TIP | YES | YES | NO | NO | NO | NO | NO |
| 51 | 1452918 | AR | 54 | TIP | YES | YES | NO | NO | NO | NO | NO |
| 52 | 1231355 | SR | 43 | TIP | YES | NO | YES | NO | YES | NO | NO |
| 53 | 119956 | JK | 26 | MIDDLE | YES | YES | YES | NO | YES | NO | NO |
| 54 | 1416893 | HK | 30 | TIP | YES | NO | NO | NO | NO | NO | NO |
| 55 | 1415990 | KK | 35 | TIP | YES | NO | NO | NO | NO | NO | NO |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **OPERATING TIME (MINUTES)** | **NEED FOR LAPROSCOPIC TO OPEN CONVERSION** | **NEED FOR STOMA FORMATION** | **ANY OTHER COMPLICATION** | **DURATION OF HOSPITAL STAY IN DAYS** | **POST OP DAY WHEN PATIENT WAS STARTED ON SEMI SOLID DIET** | **CASES WHERE READMISSION WAS REQUIRED** |
| **SR. NO** | **MRD NO** | **NAME** | **AGE** | | | | | | | |
| 49 | 1479092 | PD | 46 | 110 | NO | NO | NO | 6 | 3 | NO |
| 50 | 1453666 | SK | 23 | 70 | NO | NO | NO | 5 | 2 | NO |
| 51 | 1452918 | AR | 54 | 98 | NO | NO | NO | 6 | 3 | NO |
| 52 | 1231355 | SR | 43 | 122 | NO | NO | NO | 5 | 3 | NO |
| 53 | 119956 | JK | 26 | 120 | NO | NO | NO | 8 | 5 | NO |
| 54 | 1416893 | HK | 30 | 109 | NO | NO | NO | 5 | 2 | NO |
| 55 | 1415990 | KK | 35 | 70 | NO | NO | NO | 4 | 2 | NO |

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No. BFUHS/2K23p-TH/ 53

Date 1/1/24

The Principal
Dayanand Medical College & Hospital
Ludhiana

**Subject:: Approval of Plan of Thesis.**

This is to inform you that the Faculty of Medical Sciences in its meeting held on 25.09.2023 has approved the plan of thesis of **Anmol Khosla**, a student of your college for **MS General Surgery** along with the names of Supervisor/Co-Supervisor as under:-

**Topic Plan of Thesis**
Clinical outcome of laparoscopic management of appendicular mass .

| Supervisor | Co-Supervisor:- | Co-Supervisor:- |
|---|---|---|
| Dr. Sanjeev Kumar Singla | Dr. Munish Kumar Trehan | Dr. Varun Gupta |
| Professor | Asoc. Prof | Asoc. Prof |
| Dept. of General Surgery | Dept. of General Surgery | Dept. of General Surgery |

The student may submit the thesis in triplicate alongwith the plan in triplicate also, to the Controller of Examinations, BFUHS, Faridkot, at least six months before the commencement of theory examination, if he/she is otherwise eligible to take the examination. He /She may be directed to attach a photocopy of this letter with the forwarding letter while submitting thesis in the University along with the letter of approval of University for change of supervisor/Co-Supervisor, change of topic, if any.

Controller of Examinations

*Note :*

1. *If any discrepancy found regarding topic of thesis or Supervisor/Co-Supervisor, inform undersigned within one month after issue of this letter.*

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# CLINICAL OUTCOME OF LAPAROSCOPIC MANAGEMENT OF APPENDICULAR MASS

## THESIS PROPOSAL

FOR APPROVAL OF SUBJECT OF THESIS TO BE SUBMITTED

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

MASTER OF SURGERY

IN

GENERAL SURGERY

OF THE

BABA FARID UNIVERSITY OF HEALTH SCIENCES

FARIDKOT

OCTOBER, 2022

DR. ANMOL KHOSLA

DEPARTMENT OF GENERAL SURGERY

DAYANAND MEDICAL COLLEGE & HOSPITAL,

LUDHIANA.

# ABSTRACT OF PLAN OF THESIS

| | |
|---|---|
| Title | CLINICAL OUTCOME OF LAPAROSCOPIC MANAGEMENT OF APPENDICULAR MASS |
| For the degree of | Master of Surgery |
| Name of the candidate | Dr. Anmol Khosla |
| Supervisor | Dr. Sanjeev Kumar Singla, Professor, Department of General Surgery, DMCH Ludhiana. |
| Co-Supervisor | Dr. Munish Kumar Trehan, Associate Professor, Department of General Surgery, DMCH Ludhiana.<br>Dr. Varun Gupta, Associate Professor., Department of General Surgery, DMCH Ludhiana. |
| Institution | Dayanand Medical College and Hospital, Ludhiana |
| University | Baba Farid University of Health Sciences, Faridkot |

**Introduction:** Acute appendicitis remains the most common intraabdominal surgical pathology requiring surgical intervention. The cases of patients presenting late in the course of acute appendicitis are complicated by the development of an inflammatory mass in the right iliac fossa. This mass, is in fact the bodys own protective mechanism to wall off the infection and prevent diffuse peritonitis from developing. The treatment of appendicular mass is controversial. It is changing from the traditional approach of initial conservative treatment followed by interval appendectomy to immediate appendectomy. Moreover, there is growing evidence that Laparoscopic Appendicectomy is better for such cases, with it providing us better visualization of the abdominal cavity and surrounding structures than the minimal McBurnleys incision given in Open appendicectomy. And that, is going to be the focus of our study.

**Aim of Study:** To analyse the factors contributing to Morbidity following laparoscopic management of appendicular mass.

To evaluate outcome following laparoscopic management of appendicular mass.

**Materials & methods:** A prospective study of patients with Appendicular mass undergoing Laparoscopic management in the department of General Surgery, Dayanand medical college and hospital, over a period of 2 year .

**Keywords:** Laparoscopic Appendicectomy, Appendicular mass, , Early Appendicecomy.

(Signature) Candidate | (Signature) Co-supervisor | (Signature) Co-supervisor | (Signature) Supervisor | (Signature) Principal

# CERTIFICATE OF FACILITIES AVAILABLE

This is to certify that the facilities for work on the subject of thesis titled **"CLINICAL OUTCOME OF LAPAROSCOPIC MANAGEMENT OF APPENDICULAR MASS"** exist in the Department of General Surgery at Dayanand Medical College and Hospital, Ludhiana and will be provided to the candidate. We will see that the data being included in the thesis are genuine and is collected by the candidate himself under our supervision and guidance.

**Supervisor**

**Dr. Sanjeev Kumar Singla**
Professor
Department of General Surgery
DMCH, Ludhiana

**Co-Supervisors**

**Dr. Munish Kumar Trehan**
Associate Professor,
Department of General Surgery
DMCH Ludhiana

**Dr. Varun Gupta**
Associate Professor,
Department of General Surgery
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**Head of the Department**

**Dr. Jaspal Singh**
Professor & Head
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Place : _____

Date : _____

# APPROVAL PROFORMA BY
# RESEARCH & ETHICAL COMMITTEE
# DAYANAND MEDICAL COLLEGE & HOSPITAL, LUDHIANA

| | |
|---|---|
| **Name of candidate** | DR. ANMOL KHOSLA |
| **Department** | MS GENERAL SURGERY |
| **Topic of Thesis** | CLINICAL OUTCOME OF LAPAROSCOPIC MANAGEMENT OF APPENDICULAR MASS |
| **Likely date of appearing in PG examination** | May/June, 2024 |
| **Date of enrollment** | 07/03/2022 |
| **Name of Head of Department** | Dr. Jaspal Singh |
| **1) Supervisor**<br><br>**2) Co-Supervisor** | Dr. Sanjeev Kumar Singla<br><br>Dr. Munish Kumar Trehan<br>Dr. Varun Gupta |
| **Signature of Members of Research Committee with Stamp** | **Signature of Members of Ethics Committee with Stamp** |
| Dr. Harpreet Kaur<br>(Professor & Head, Pathology) | Mr. R K Sharma<br>(Legal Expert) |
| Dr. Jaspal Singh<br>(Professor & Head, Surgery) | Dr. Ramit Mahajan<br>(Associate Professor, Gastroenterology) |
| Dr. Dinesh Gupta<br>(Professor & Head, Medicine) | Dr. Anu Sharma<br>(Professor, Anatomy) |
| Dr. Sandeep Kaushal<br>(Dean Academics & Professor & Head, Pharmacology) | Dr. Sandeep Kaushal<br>(Dean Academics & Professor & Head, Pharmacology) |
| Dr. Gurpreet S Wander<br>(Vice Principal) | Dr. Gurpreet S Wander<br>(Vice Principal & Professor & Head, Cardiology) |
| | Dr. Gagandeep Singh<br>(Secretary, Ethics Committee Professor & Head, Neurology) |

**Approved: Yes / No**

**Dr. Sandeep Puri**
**Chairperson**
**Research Committee**

**Approved: Yes / No**

**Prof. Arvind Malhotra**
**Chairperson**
**Ethics Committee**

# BABA FARID UNIVERSITY OF HEALTH SCIENCES, FARIDKOT

## PROFORMA FOR REGISTRATION OF SUBJECT FOR DISSERTATION

| | | |
|---|---|---|
| 1 | NAME OF THE CANDIDATE AND ADDRESS | DR. ANMOL KHOSLA<br><br>451 MODEL TOWN, LUDHIANA |
| 2 | NAME OF THE INSTITUTE | DAYANAND MEDICAL COLLEGE AND HOSPITAL, LUDHIANA |
| 3 | COURSE OF STUDY AND SUBJECT | MS, GENERAL SURGERY |
| 4 | DATE OF ADMISSION OF COURSE | 7th MARCH,2022 |
| 5 | TITLE OF THE TOPIC | CLINICAL OUTCOME OF LAPAROSCOPIC MANAGEMENT OF APPENDICULAR MASS |

## 6. BRIEF RESUME OF THE INTENDED WORK

### 6.1 NEED FOR THE STUDY

Acute appendicitis remains the most common intra abdominal surgical pathology requiring surgical intervention. The cases of patients presenting late in the course of acute appendicitis are complicated by the development of an inflammatory mass in the right iliac fossa. This mass, is in fact the body's own protective mechanism to wall off the infection and prevent diffuse peritonitis from developing. The treatment of appendicular mass is controversial. It is changing from the traditional approach of initial conservative treatment followed by interval appendicectomy to immediate appendicectomy. Early surgical intervention has been known to be an effective alternative to conservative therapy for a long time, as it considerably reduces the total hospital stay and obviates the need for a second admission. Moreover, in 10-20% of the cases, conservative management fails and the patients need an emergency operation due to peritonitis, which is comparatively more difficult and carries more morbidity and mortality.In addition, the patient may suffer a recurrence of appendicitis after being discharged from the hospital. In rural areas, a large number of patients refuse an operation once their acute problem is solved and this seems to be a major disadvantage of the initial conservative approach. Another disadvantage of the conservative management is the chance of misdiagnosis like intussusceptions and carcinoma caecum may be treated conservatively by mistake adding considerable morbidity.The early operation on the other hand has an edge of being curative in the index admissionand ensures early return to-work and higher compliance.

Controversy is not only confined to management, but is also about the technique, laparoscopy versus open.There is growing evidence that laparoscopic appendicectomy is better for such cases, with it providing us better visualization of the abdominal cavity and surrounding structures than the minimal McBurney's incision given in

open appendicectomy. Laparoscopic appendicectomy has many advantages over traditional open appendicectomy. In properly prepared and selected patients, post-operative pain, post-operative complications like vomiting, wound infection, fever, duration of hospital stay are less. Other benefits being cosmetic benefits, early return to work, early return of bowel function etc. This is at cost of increase in durations of surgery and cost of surgery. However, it may be possible to reduced costs by stringent use of disposable equipment & adhering to standard operative protocols which minimizes changes of infection and hence minimizes morbidity and leads to decreased hospital stay. Laparoscopy also has the distinct advantages of picking up additional pathology like intra abdominal bowel adhesions, ovarian cyst, Meckel's diverticulum, sigmoid perforation and military tuberculosis etc.

These advantages versus disadvantages are going to be the focus of our study.

## 6.2 REVIEW OF LITERATURE

Leonardo da Vinci, clearly depicted the organ in his anatomical Drawings.

Vidovidius first named the worm- like organ as the vermiform appendix in 1530.

Great scholar Erasmus was the first to record a case of appendicitis with Abscess formation in 1530.

Verneys was the first to coin the term appendix vermiformis, the first description of appendicitis in 1710.

Claudis Amyand, surgeon to Westminster and St. Georges hospitals and sergeant surgeon to George performed the first appendicectomy in 1736. He operated on a boy of 11 years who had a right scrotal hernia accompanied by fistula, within the scrotum was found appendix perforated, the appendix was ligated and all or a part of it was removed with recovery of the patient.

Heister recognized that the appendix might be the site of acute primary inflammation in an autopsy on the body of a criminal who had been executed in 1755.The first textbook, that gave the description of the symptoms of inflammation and perforation of the appendix was by Bright and Addision in 1839. Reginald Fitz coined the term “Appendicitis” and recommended early surgical intervention for the disease in 1886.

Charles McBurney presented a report on early operative intervention for acute appendicitis to the New York surgical society in 1889. 5 years later in 1894, he formalized the procedure and described the McBurney’s incision.[1]

Murphy clearly described the appropriate sequence of symptoms of pain followed by nausea and vomiting with fever and exaggerated local tenderness at the position occupied by the appendix in 1905.

One of the most recent trends in the surgical therapy involves the use of minimal invasive laparoscopic procedure. A German gynaecologist Kurt Semm[2], introduced laparoscopy as a method for the removal of a diseased appendix which was incidentally picked up during a gynaecologic procedure in 1983.

Pier , Gotz , and Bacher (1991) [3], published the first large series of laparoscopic appendectomies for acute appendicitis based on a data of 625 cases. They demonstrated that the procedure could be applied to most cases of appendicitis with a high degree of success, a low complication rate, operative speed comparable to a traditional open appendicectomy.

Attwood and colleagues [4] in their study concluded that laparoscopic appendicectomy is superior to open appendicectomy in terms of hospital stay ,post-operative complication and return to normal activities and is recommended as a approach of choice in case of acute appendicitis in 1992.

Heikkinen, Haukipuro and Hulkko [5] compared outcome and cost benefit of laparoscopic appendicectomy and open appendicectomy in 40 patients. 9 patients underwent laparoscopic appendicectomy and 21 underwent open appendicectomy in 1998. They found that median operating time of laparoscopic appendicectomy was 91 min as compared to open technique which was 82 min. No difference in post-operative pain or fatigue was noted. Return to normal activities was 14 days in case of laparoscopic appendicectomy compared to 26.5 days in case of open and the hospital cost for laparoscopic appendicectomy was $8538 compared to open $6788.They concluded that laparoscopic appendicectomy was as safe as open, the hospital cost are higher but laparoscopic appendicectomy offers significant cost saving to the payer

for working patient because of early return to work and making it less expensive over all.

In 1992, by OJ McAnena and colleagues, [6] reported prospective evaluation of laparoscopic surgery for acute appendicitis over a 6 month period. 65 patients (age range 14-64) with signs & symptoms of appendicitis necessitating surgery were assigned to open (n=36) or laparoscopic (n=29) modality. The mean post-operative stay for open operative was 4.8 days and for laparoscopic, rate was 2.2 days (P,0.05). The wound infection rate was 11% (n=4) for open and it's 4% (n=1) for laparoscopic appedicectomy (P< 0.05). After open appendicectomy patients had a median five Intramuscular injection of analgesia compared with a median of one in laparoscopic group (P<0.05). The result suggested that emergency laparoscopic appendicectomy should be explored further as an alternative to open surgery for acute appendicitis

A comparative study by V.L. Vallina and colleagues (1993) [7]concluded that laparoscopy is a useful adjunct to the management of patients with a presumed diagnosis of appendicitis. A meta-analysis of 35 randomized controlled trials revealed that the operating time was significantly longer for laparoscopy and hospital stay was shorter. With 81% of patients being discharged on their first post-operative day (P<0.001). The laparoscopic appendicectomy patients required significantly less narcotic analgesia (P< 0.02).

U Guller, S Hervey et al (2004) [8] conducted a retrospective study having 43757 patients database (discharge abstracts).7618 patient (17.4%) underwent laparoscopic appendicectomy as compared to 36139 patient (82.6%) for open appendicectomy. Patient had an average age of 30.7 years. It was observed that laparoscopic appendicectomy was associated with shorter median hospital stay (Laparoscopic appendicectomy :2.06 days, Open appendectomy 2.88 days , (P< 0.0001), lower rate of infection (odds ratio [OR]=0.5, [0.38,0.66], P=0.0001) decreased gastro intestinal complications

(OR=0.8 [0.68,0.96],P=0.02), lower overall complication (OR=0.84[0.75,0.94],P=0.002 and higher rate of routine discharge (OR=3.22[ 2.47,4.46], P<0.00001). Thus the study concluded that laparoscopic appendectomy has significant advantages over open appendectomy with respect to length of hospital stay, rate of routine discharge, and post-operative in-hospital morbidity.

A prospective study by P.Sathis Prabhu [9] in Dr.M.G.R Medical University Chennai, involved 60 patient over 13 months period (2014-2015) with diagnosis of acute appendicitis, concluded that laparoscopic appendicectomy in properly prepared and selected patient, had many advantages in terms of post-operative pain, post-operative complication like vomiting, wound infection, fever, duration of hospital stay, return to work cosmetic benefits at the cost of increase in duration of surgery. Lap appendicectomy is increasingly being used particularly in young females of child bearing age where the differential diagnosis of right lower quadrant pain is extensive including gynaecologic pathology. Critics of Laparoscopic appendicectomy often point to the increased cost of surgical equipment as a major disadvantages, Despite these concerns, however the cost effectiveness for the laparoscopic appendicectomy is easily realized once the decreased hospital stay and entire patients convalescence period are accounted.

Utpal D [10] conducted a study in west Bengal, India, 2015 on 279 patient suffering from acute appendicitis. He concluded that for laparoscopic appendicectomy, hospital stay was significantly shorter and the one time operative cost appeared to be marginally the same as open surgery. Furthermore Laparoscopic appendectomy was associated with increased clinical comfort in term of fewer wound infection, faster recovery, earlier retune to work & improved cosmoses.

Laine and Rantala (1997) [11] concluded that younger women with right iliac fossa pain laparoscopic management can give precise diagnosis and reduce the rate of negative appendectomy. In 2007 Yong JL and colleagues [12], during their retrospective study on 82 patients who

underwent Laparoscopic appendectomy (Group A) and 119 underwent Open appendicectomy (Group B). The median durations of surgery in Group A and Group B were 80 minutes (range, 40 to 195) and 60 minutes (range, 25 to 260), respectively (P<0.005).Post-operative complication rate were comparable between the 2 groups (13.4% in Groups A Versus 15.8% in Group B). The median hospital stay for patients in Group A and Group B were 3.0 days & 4.0 days respectively (P=0.037). Hence it was concluded that Lap appendicectomy for suspected acute appendicitis is safe and is associated with significantly shorter hospital stay. Other intra-abdominal pathologies can also be diagnosed more accurately with the Laparoscopic appendicectomy.

An observational study by Mazhar Abbas and colleagues [13] involving 50 patients of age between 13 to 25 years, having pain in right iliac fossa and admitted with the diagnosis of acute appendicitis from Oct 2016 to Dec 2017 was presented. It concluded diagnostic laparoscopy helped in correctly diagnosing the associated incidental findings like ovarian cyst, Miliary abdominal TB, Endometriosis, ovarian cyst torsion etc.

Tomonide Hori et al (2017) [14] concluded that Acute appendicitis is physiologically progressive and as time passes, it is difficult to control. Hence prompt laparoscopic appendicectomy in a quadratic/ tertiary care hospital is mandatory for acute appendicitis. Interval/ delayed appendicectomy and conservative management may be less costly but arte unsuitable. It may be possible to reduce cost by more stringent use of disposable equipment and standardizing recovery protocols.

In a prospective study conducted during Jan 2011 to May 2019 by Md.Manir Hossain Khan and colleagues [15], in some hospitals of Dhaka, Bangladesh on 19 patients, it was concluded that total management of perforated appendicitis is excellent. So it is now considered as standard procedure.

Hence though laparoscopic appendicectomy is preferred for patients presenting with acute appendicular mass, its impact on outcome is being studied. There is need for further study on revision, re-admission along with various factors like co-morbidity, demographics, duration of surgery, which can have a bearing on results.

## 6.3 AIMS AND OBJECTIVES OF THE STUDY

- To analyze the factors contributing to morbidity following laparoscopic management of appendicular mass.
- To evaluate outcome following laparoscopic management of appendicular mass.

## 7.0 MATERIALS AND METHODS

We plan a prospective study whereby all the patients undergoing laparoscopic management of appendicular mass (Radiologically proven/ Intra op finding) At DMCH Ludhiana for the 2 year period of October 2022 to October 2024, and followed up for the duration of the study.

## 7.1 SOURCE OF DATA

A prospective study will be done on patients undergoing laparoscopic management of appendicular mass in the department of General Surgery Dayanand medical college and hospital, Ludhiana during a 2-year period

**INCLUSION CRITERIA:**

1. All patients diagnosed with appendicular mass(clinically palpable/ on imaging modalities/intra op finding)Undergoing laparoscopic appendicectomy
2. Patients who are 18 years old or above
3. Patients of both genders.

**EXCLUSION CRITERIA:**

1. Pregnant women
2. Other masses of abdominal wall, urological or gynaecological origin
3. Patients presenting with peritonitis
4. Patients not consenting to be a part of the study

## 7.2 METHOD OF COLLECTION OF DATA

All patients undergoing laparoscopic management of appendicular mass will be included in study. Demographic information of general physical and systemic examination will be recorded. Co-relation of any comorbidity as well as various intraoperative findings such as appendicular abscess, inflamed caecum making it difficult to undergo

the laparoscopic procedure will be studied and outcomes will be measured.

**STATISTICAL ANALYSIS**

Data will be described in terms of range; mean ±standard deviation (± SD), frequencies (number of cases) and relative frequencies (percentages) as appropriate. All statistical calculations will be done using (Statistical Package for the Social Science) SPSS 21version (SPSS Inc., Chicago, IL, USA) statistical program for Microsoft Windows.

**7.3 DOES THE STUDY REQUIRE ANY INVESTIGATIONS OR INTERVENTIONS TO BE CONDUCTED ON PATIENTS OR OTHER HUMANS OR ANIMALS? IF SO, PLEASE DESCRIBE BRIEFLY.**

This study involves analysis of patients undergoing laparoscopic management of appendicular lump, and study of their intra operative and post operative parameters.

**7.4 HAS ETHICAL CLEARANCE BEEN OBTAINED FROM YOUR INSTITUTION IN CASE OF 7.3?**

Yes, attached herewith.

## 8. LIST OF REFERENCES


1. McBURNEY CH. IV. The incision made in the abdominal wall in cases of appendicitis, with a description of a new method of operating. Annals of surgery. 1894;20:38.
2. Semm K. Endoscopic appendectomy. Endoscopy. 1983;15:59–6
3. Arnold Pier, F.Gotz&C.Bacher. Laparoscopic Appendectomy in 605 cases; from innovation to routine, journal Surgical Laparoscopy and Endoscopy , year 1991, Volume 11.
4. Attwood SE, Hill AD, Murphy PG, Thornton J, Stephens RB. A prospective randomized trial of laparoscopic versus open appendectomy. Surgery. 1992;112:497-501
5. Heikkinen TJ, Haukipuro K, Hulkko A. Cost-effective appendectomy. Surgical endoscopy. 1998;12:1204-8.
6. Laparoscopic Versus Open Appendectomy; a prospective evaluation; OJMcAnena,. O Austin, PROconnell,W P Henderman, TFGorey, Br J Surg. 1992;79;818-20
7. Laparoscopic Versus conventional appendectomy V L Vallina, J.M.Velasco and CSMcCulloch, Annals of Surgery 1993; 218;685-92
8. Guller U, Hervey S, Purves H, MuhlbaierLH, Peterson ED, Eubanks S, et al. Laparoscopic versus open appendectomy: outcomes comparison based on a large administrative database. Annals of surgery. 2004;239:43-2.
9. Sathish Prabhu P.A comparative study of laparoscopic appendectomy versus open appendectomy in terms of postoperative pain, post operative complications, duration of the hospital stay, return to the work, cosmetic benefit, duration of time of the surgery in our institution (doctoral dissertation, Dr. M.G.R Medical University, Chengalpattu,Chennai, 2016,84-86).

10. Laparoscopic Versus open Appendectomy in West Bengal India D. Utpal Oct 2015, Chinese Journal of Digestive diseases / Volume 6, issue 4.
11. Laine S, Rantala A, Gullichsen R, Ovaska J. Laparoscopic appendectomy—is it worthwhile?. Surgical endoscopy. 1997;11:95-7
12. Yong JL, Law WL, Lo CY, Lam CM. A comparative study of routine laparoscopic versus open appendectomy. JSLS: Journal of the Society of Laparoendoscopic Surgeons. 2006;10:188.
13. Abbas M, Noor M, Khan MF. Advantages of Laparoscopic Appendectomy in young females. Pakistan journal of medical & health sciences. 2018;12:449-50.
14. Hori T, Machimoto T, Kadokawa Y, Hata T, Ito T, Kato S, et al. Laparoscopic appendectomy for acute appendicitis: How to discourage surgeons using inadequate therapy. World Journal of Gastroenterology. 2017;23:5849.
15. Khan MM, Sultana J, Ahsan T, Ahsan SA. Laparoscopic management of perforated appendicitis-a study of 90 cases. Journal of Surgical Sciences. 2019;23:59-66.

# PROFORMA

SR. NO.: MRD NO.:

NAME: AGE AND SEX:

ADDRESS:

PHONE NUMBER

DOA:

DOD:

CHIEF COMPLAINTS ON PRESENTATION:

COMORBIDITIES (IF ANY) :

PAST HISTORY OF SURGERY (IF ANY):

CLINICAL EXAMINATION:

PALLOR CYANOSIS

ICTERUS LYMPHADENOPATHY

EDEMA

BP: HR:

SPO2: RR:

TEMPERATURE:

**Signature of the Candidate** **Signature of the Supervisor**

SYSTEMIC EXAMINATION:

| | |
|---|---|
| 1. CHEST EXAMINATION | |
| 2. CNS | |
| 3. CVS | |
| 4. PER ABDOMEN FINDINGS: | |

| INVESTIGATION | | | | | |
|---|---|---|---|---|---|
| Hemoglobin | | | | | |
| TLC | | | | | |
| AST | | | | | |
| ALT | | | | | |
| S. Creatinine | | | | | |
| S. Sodium | | | | | |
| S. Potassium | | | | | |
| S. Chloride | | | | | |

| USG ABDOMEN FINDINGS | CT ABDOMEN FINDINGS (WHERE APPLICABLE) |
|---|---|
| | |

**Signature of the Candidate** **Signature of the Supervisor**

INTRA OP FINDINGS:

OPERATING TIME:

| Time of Start of Operation | End Time |
|---|---|
| | |

NEED FOR LAPAROSCOPIC TO OPEN CONVERSION:

YES/NO

NEED FOR STOMA FORMATION:

YES/NO

ANY OTHER COMPLICATION:

DURATION OF HOSPITAL STAY:

POST OP DAY WHEN PATIENT WAS STARTED ON SEMI SOLID DIET:

CASES WHERE READMISSION WAS REQUIRED (Y/N):

**Signature of the Candidate** **Signature of the Supervisor**

**INFORMED PATIENT CONSENT**

Date: _____

I…….D/o, W/o, S/o……..…… am willing to participate in the study **"CLINICAL OUTCOME OF LAPAROSCOPIC MANAGEMENT OF APPENDICULAR MASS"** The procedure with its complications has been explained to me in local vernacular language. I have fully understood that no special tests and extra expenditure in any form, merely for the purpose of thesis is being carried out. I am free to opt out the study any time without assigning any reason.

……. ……
Signature of the Witness Signature of the patient

Name:

**Signature of Candidate** **Signature of Supervisor**

# मरीज अनुमति फार्म

तिथि _____

मैं _____ पत्नी/पुत्र/पुत्री _____
निवासी _____
इस शोधकार्य **"CLINICAL OUTCOME OF LAPAROSCOPIC MANAGEMENT OF APPENDICULAR MASS"** में भाग लेने के लिए सहमत हूँ। मैं इस शोधकार्य में भाग लेने के लिए अपनी स्वेच्छा से तैयार हूँ। मैं पुष्टि करता/करती हूँ की यह स्वीकृति देने के लिए मुझे कोई आर्थिक प्रलोभन नहीं दिया गया और न ही दबाव डाला गया है। मुझे इस शोधकार्य का उद्देश्य स्पष्ट कर दिया गया है और मुझे यह विश्वास है की यह विज्ञान और मानवता के लाभ के लिए है। मुझे इस शोधकार्य में होने वाले जोखिम के बारे में समझा दिया गया है और मेरी समझ में यह जोखिम बहुत मामुली है।

मैं इस शोधकार्य में भाग लेने के सम्बन्ध में किसी भी समय अपनी अस्वीकृति व्यक्त कर सकता/सकती हूँ और मेरे अस्वीकृति व्यक्त करने का मेरे इलाज पर कोई प्रभाव नहीं पड़ेगा।

| | |
|---|---|
| _____ | _____ |
| गवाह के हस्ताक्षर | रोगी के हस्ताक्षर/अंगूठे का निशान |
| नाम: | नाम: |

_____
अन्वेषक के हस्ताक्षर

_____
विद्यार्थी के हस्ताक्षर

# ਮਰੀਜ਼ ਰਜ਼ਾਮੰਦੀ ਫਾਰਮ

ਮਿਤੀ_____

ਮੈ_____ਪਤਨੀ/ਪੁੱਤਰ/ਪੁੱਤਰੀ_____

ਵਾਸੀ _____

**“CLINICAL OUTCOME OF LAPAROSCOPIC MANAGEMENT OF APPENDICULAR MASS”** ਤੇ ਚਲ ਰਹੀ ਖੋਜ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਰਜ਼ਾਮੰਦ ਹਾਂ। ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਮੈ ਆਪਣੀ ਮਰਜ਼ੀ ਨਾਲ ਤਿਆਰ ਹਾਂ। ਮੈ ਇਹ ਦਸਣਾ ਚਾਹੁੰਦਾ ਹਾਂ/ ਚਾਹੁੰਦੀ ਹਾਂ ਕੇ ਇਹ ਰਜ਼ਾਮੰਦੀ ਦੇਣ ਵਾਸਤੇ ਮੈਨੂ ਕਿਸੇ ਵੀ ਤਰਾਂ ਦਾ ਲੋਭ-ਲਾਲਚ ਨਹੀ ਦਿੱਤਾ ਗਿਆ ਅਤੇ ਨਾ ਹੀ ਕੋਈ ਦਬਾ ਪਾਇਆ ਗਿਆ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਦਾ ਮਨੋਰਥ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ ਅਤੇ ਮੈਨੂ ਇਹ ਭਰੋਸਾ ਦਵਾਇਆ ਗਿਆ ਹੈ ਕੇ ਇਹ ਖੋਜ ਵਿਗਿਆਨ ਅਤੇ ਮਾਨਵਤਾ ਦੀ ਭਲਾਈ ਲਈ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਵਿਚ ਹੋਣ ਵਾਲੇ ਖਤਰੇ ਬਾਰੇ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ ਅਤੇ ਮੈਨੂ ਇਹ ਯਕੀਨ ਹੈ ਕੇ ਇਹ ਖਤਰਾ ਬਹੁਤ ਮਾਮੂਲੀ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਦਾ ਢੰਗ – ਤਰੀਕਾ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ।

ਮੈ ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਬਾਰੇ ਆਪਣੀ ਰਜ਼ਾਮੰਦੀ ਕਿਸੇ ਵੀ ਸਮੇ ਵਾਪਸ ਲੈ ਸਕਦਾ ਹਾਂ/ ਸਕਦੀ ਹਾਂ ਅਤੇ ਮੇਰੀ ਰਜ਼ਾਮੰਦੀ ਵਾਪਸ ਲੈਣ ਦਾ ਮੇਰੇ ਇਲਾਜ ਤੇ ਕੋਈ ਅਸਰ ਨਹੀ ਹੋਵੇਗਾ।

_____ _____

ਗਵਾਹ ਦੇ ਹਸਤਾਖਰ ਮਰੀਜ਼ ਦੇ ਹਸਤਾਖਰ

ਮਿਤੀ_____ ਮਿਤੀ_____

ਪਤਾ _____ ਪਤਾ _____

_____

ਨਿਰੀਖਕ ਦੇ ਹਸਤਾਖਰ

_____

ਸਿਖਿਆਰਥੀ ਦੇ ਹਸਤਾਖਰ